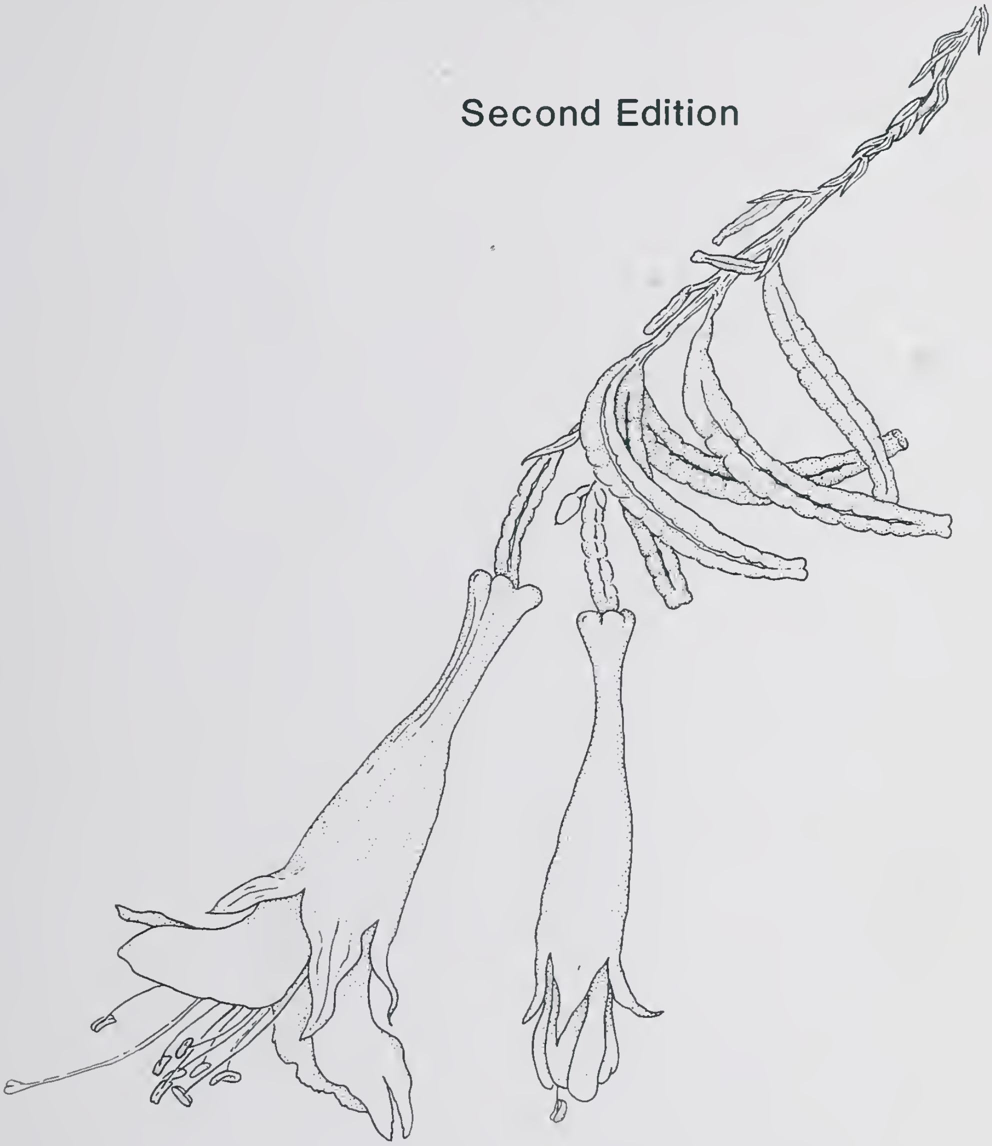
FLORA OF THE SANTA MONICA MOUNTAINS, CALIFORNIA

Second Edition



by Peter H. Raven, Henry J. Thompson, and Barry A. Prigge

SOUTHERN CALIFORNIA BOTANISTS
SPECIAL PUBLICATION No. 2

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List of Errata

Page no.	Under	Correction
10	Chaparral	Underline species listed
12	Valley Grassland	although most of the valley . . .
19	Figure 12	abscissa = area (km^2) ordinate = number of native species
38	**C. edulis**	**C. aequilateralis ---> C. aequilaterus**
106	**Proboscidea louisianica**	Apparently no vouchers exist to verify its
147		**Lamarckia**
156	**H. murinum**	rachilla or lateral ---> rachilla of lateral
157	**L. perenne**	***L. perenne** L. var. **pernne.** ---> ***L. perenne** L.
163	Berry	indehiscent fruit with
169	Literature Cited	add: Cain, S. 1950. Life-forms and phytoclimate. Bot. Rev. 16: 1-32.
173	Index	more than one word

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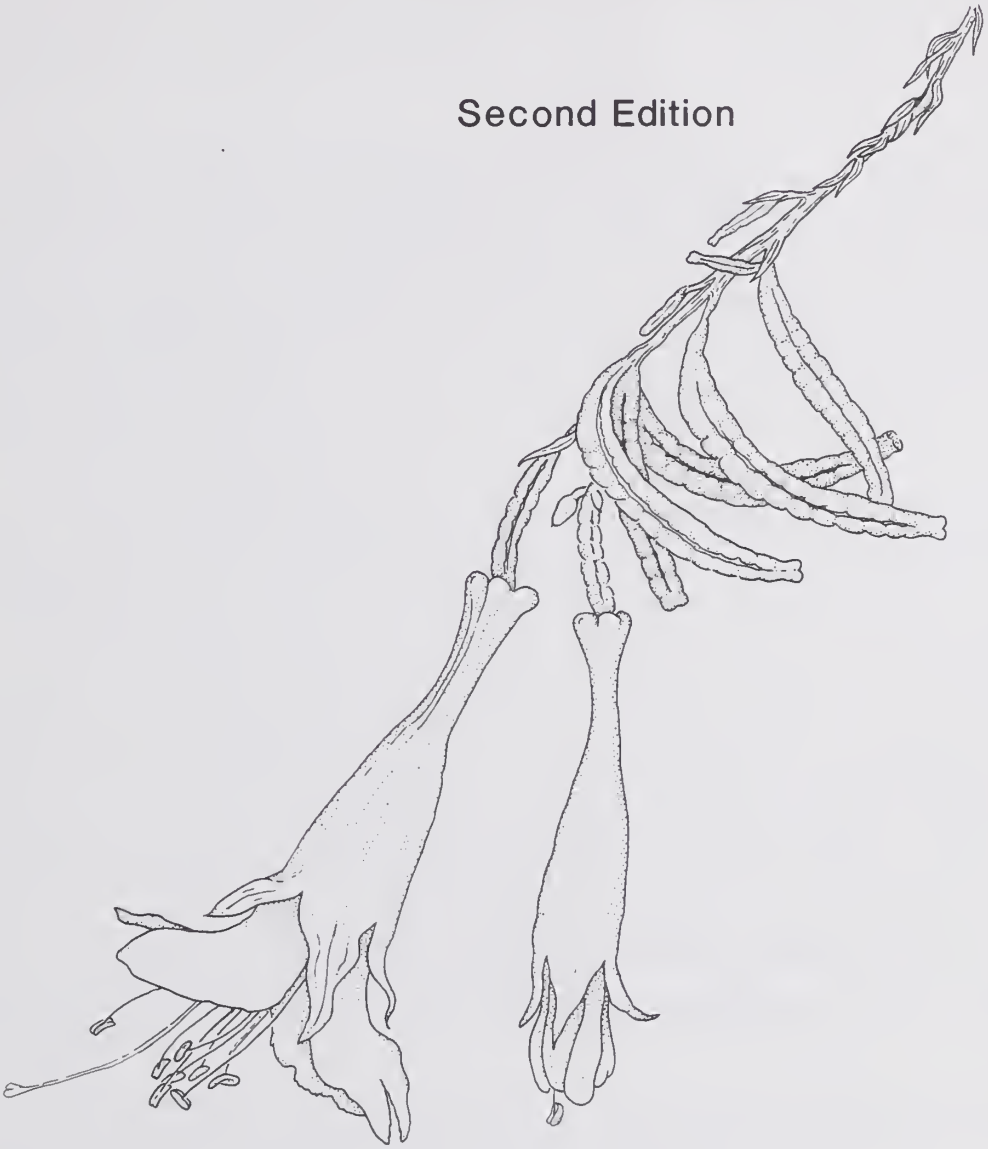

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QK
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.R37
1986

University of California, Los Angeles

First Edition: June, 1966
Revised: January, 1977. D.S. Verity

Second Edition: June, 1986

Cover: **Epilobium canum**, redrawn from a drawing by A.M. Johnson

PREFACE

Since the **Flora of the Santa Monica Mountains, California** was first published in 1966 by Peter Raven and Henry Thompson, it has proven to be a valuable and popular reference manual for learning the local flora. In 1977 the flora was revised and the nomenclature was updated by David Verity. Since then many species that were not included in the flora have been brought to our attention. The greatest number of additions are from the enthusiastic collecting of Michael Grayum and Daryl Koutnik (1982) who published a list of 31 new record for the Santa Monica Mountains. In addition to their work many students of the flora, Timothy Thomas, David Hallombe, Kei Nakai, Richard Burgess, and Grace Heintz, to name a few, have brought to the herbarium at UCLA plants that are new for the range. Thus a sizable list of new additions to the flora has been accumulated primarily through the efforts of other collectors.

Because of the sizable number of new records, the frequent requests for the flora, and the nomenclatural changes required, I have undertaken a major revision of the flora at the suggestion of Henry Thompson. This edition of the flora has been completely retyped, nomenclature updated, new species added, some of the keys reworked, and illustrations have been redrawn and some added. An introduction, which incorporates discussions on the climate, geology, plant communities, life-forms, statistics of the flora, and a map of the range, has been added. A glossary has also been added.

In total 72 species, 45 of which are native, have been added to the flora since it was first published. There are undoubtedly more species to be added as the poorly collected western end of the range is better botanized. In fact there are several species that are included in McCauley's (1985) recently published book, **Wildflowers of the Santa Monica Mountains**, that are not included in this flora. Some of these are deliberate omissions because I have not seen specimens and have not been able to find them in the field; thus, I have been unable to check their determinations. Some I feel were misdetermined or are introductions that are not naturalized. There are some omissions that I was simply not aware of and others that were probably inadvertantly omitted due to poor records. If new records of species that have been omitted are to be incorporated in an addendum or future revisions of the flora, voucher specimens have to be made with collection data and deposited at a local herbarium. Sight records and specimens of new species for the range in private collections are almost as good as never being collected. Depositing specimens in other than a local herbarium is an unnecessary inconvenience, and unless cited in a publication will undoubtedly be overlooked.

The arrangement of the flora is now alphabetical. The tribal breakdown of the Asteraceae has followed Turner and Powell (1977) where by the artificial tribe Helenieae has been eliminated and the genera of that former tribe placed in either the Heliantheae or Senecioneae. The family treatment of the Monocotyledoneae follows Dalhgren et al (1985). For current nomenclature Kartesz and Kartesz (1980) was consulted and served to highlight taxa where some nomenclatural reference work was required. However, nomenclature presented in Kartesz and Kartesz (1980) was not necessarily followed. Numerous taxonomic treatments were consulted to understand the reasons for the name changes. Even after reviewing the reasons, the choice of one name over another was often arbitrary. For introduced European species nomenclature generally follows Tutin et al (1964-1980).

It is hoped that this second edition of the **Flora of the Santa Monica Mountains, California** will be as successful as the first, will continue to stimulate botanical interest in the range, and will serve its purpose not only as a flora to the Santa Monica Mountains but as an introductory manual for beginning students who are learning how to work with keys to identify plants.

Two recently published, well illustrated books on the Santa Monica Mountains (Dale 1986; McCauley 1985) will be valuable compliments to this flora.

ACKNOWLEDGEMENTS

There are many people who deserve thanks for their contributions to the second edition of the flora. I thank the original authors Peter H. Raven and Henry J. Thompson for permitting me to revise their flora; Robert F. Thorne, Timothy Thomas, Kei Nakai, Jonathan Sauer, Mildred Mathias, Howard Towner, Douglas Allan, William Kinch, David Verity, James Henrickson, and Wayne Ferren for reviewing earlier drafts and for their suggestions; Barbara Haner for her helpful review of the introductory material on geology and climate; William Bond for information and suggestions on life-forms; Kei Nakai for the treatment on the Crassulaceae; and Kathe Rich for help with typing the manuscript. I am very appreciative of the Southern California Botanists who helped finance the typing of the manuscript and bore the cost of publication, and the University of California Press who granted me permission to use part of the glossary compiled by David D. Keck in **A California Flora** by Philip A. Munz. I also thank the many taxonomists that have helped me with the identification of technically difficult taxa and the many amateur botanist who brought in new plants, range extensions, and contributed to improving our collection of the range.

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INTRODUCTION

PHYSIOGRAPHY AND BOUNDARIES

The Santa Monica Mountains are the southwesternmost of a series of east-west trending ranges that form the Transverse Ranges of southern California. Their length is about 73 km (45 miles), extending from the Oxnard alluvial plain in Ventura County on the east to the Los Angeles River, where it bends south, in Los Angeles County on the west. Their width varies from about 5 to 21 km (3 to 13 miles) with the mountains being bordered along the southern flank by the Pacific Ocean and the Los Angeles Basin and along the northern flank by the San Fernando Valley and the Simi Hills. Malibu Creek and its tributaries, an antecedent drainage course and the only drainage system that flows through the range, divide the range in half. Elevation ranges from sea level to 948 m (3111 feet) at Sandstone Peak in the western part of the range. Most of the summits along the crestline are somewhat flattened, apparently remnants of an old Cenozoic erosion surface reduced to low relief prior to the latest series of uplift events (Dibblee 1982, Soper 1938). The range has greater precipitation on the coastal than the inland slopes which has resulted in an asymmetric erosion pattern characterized by the coastal side having lower angled slopes and longer, more pronounced canyons than the inland side (Dibblee 1982). Also, the crest of the range is on the inland side, north of the higher peaks, which generally occur as high elevations on spur ridges that extend southward.

Boundaries of the area (Fig. 1) included in this flora are, of course, arbitrary even though the Santa Monica Mountains are a very distinct range. Beginning at the city of Santa Monica and proceeding counter clockwise, the boundaries are: the southern border of Santa Monica; northward on Centinella Boulevard along the eastern boundary of Santa Monica to Santa Monica Boulevard; eastward to Western Avenue; north to Los Feliz Boulevard; eastward to the Los Angeles River, which forms the eastern and northern boundary as far west as Tarzana where Arroyo Calabasas joins the Los Angeles River; westward along Arroyo Calabasas to the Ventura Freeway; east to Thousand Oaks; northwest down Conejo Creek to Calleguas Creek; south to the ocean at the mouth of Mugu Lagoon. The southern boundary in the western half of the area is, of course, the Pacific Ocean. The most arbitrary of these boundaries is the line between Thousand Oaks and Tarzana. There the Santa Monica Mountains are joined by a broad stem to the Simi Hills which are in turn joined to the western end of the San Gabriel Mountains and to the lower ranges of northwestern Los Angeles County and eastern Ventura County. At the eastern end of the range the hills of Griffith Park extend southeast along the Los Angeles River to Elysian Park. This area should be included in the flora, but so little remains of its native vegetation that only occasional reference is made to it. The total area circumscribed by these boundaries is about 985 square km (380 square miles), of which about 195 square km (75 square miles) are now devoid of native vegetation due to urban and suburban growth and agriculture.

CLIMATE

The climate of the Santa Monica Mountains is characterized by hot, dry summers and cool, wet winters as shown by the climatic diagram (Fig. 2) for the University of California, Los Angeles (UCLA). This temperature and precipitation regime is typical of the Mediterranean region, hence the term Mediterranean climate. This climate only occurs around 33^{o} latitude on primarily the western edges of continents, specifically in central Chile, southwestern Australia, the cape region of South Africa, and, of course, the Mediterranean region and southern California. Thus, only five areas in the world or about three percent of the land surface have this climate (Bailey 1966). Because of the angle of inclination of the earth's axis with respect to its orbit, these regions have intense summer and moderate winter solar insolation. During the summer, the air is also clear and stable which minimizes atmospheric interception of solar radiation and contributes to maximum insolation. Thus, evaporation and transpiration rates are high when precipitation is extremely low. There is, therefore, the potential for considerable physiological stress for plants in this climate. Late summer and early fall, especially early fall, when moisture is seriously deficient and the vegetation becomes dangerously dry, are also times that are very conducive to fires. Selection for adaptations to this climatic regime and the periodic occurrence of fire has resulted in many interesting convergences among plants of unrelated genera or families (Raven 1973), not just in

Figure 1.
Santa Monica Mountains
Western portion

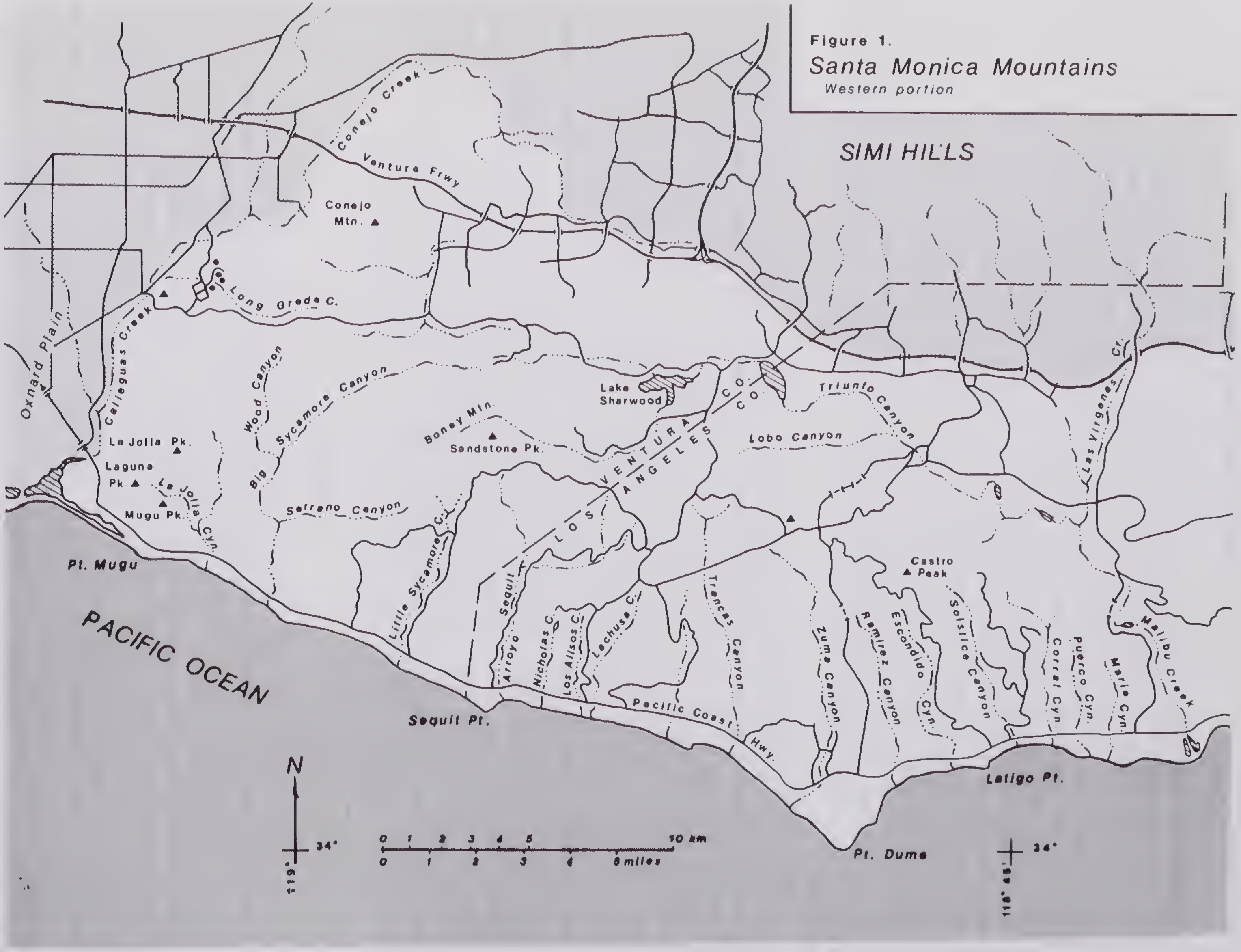
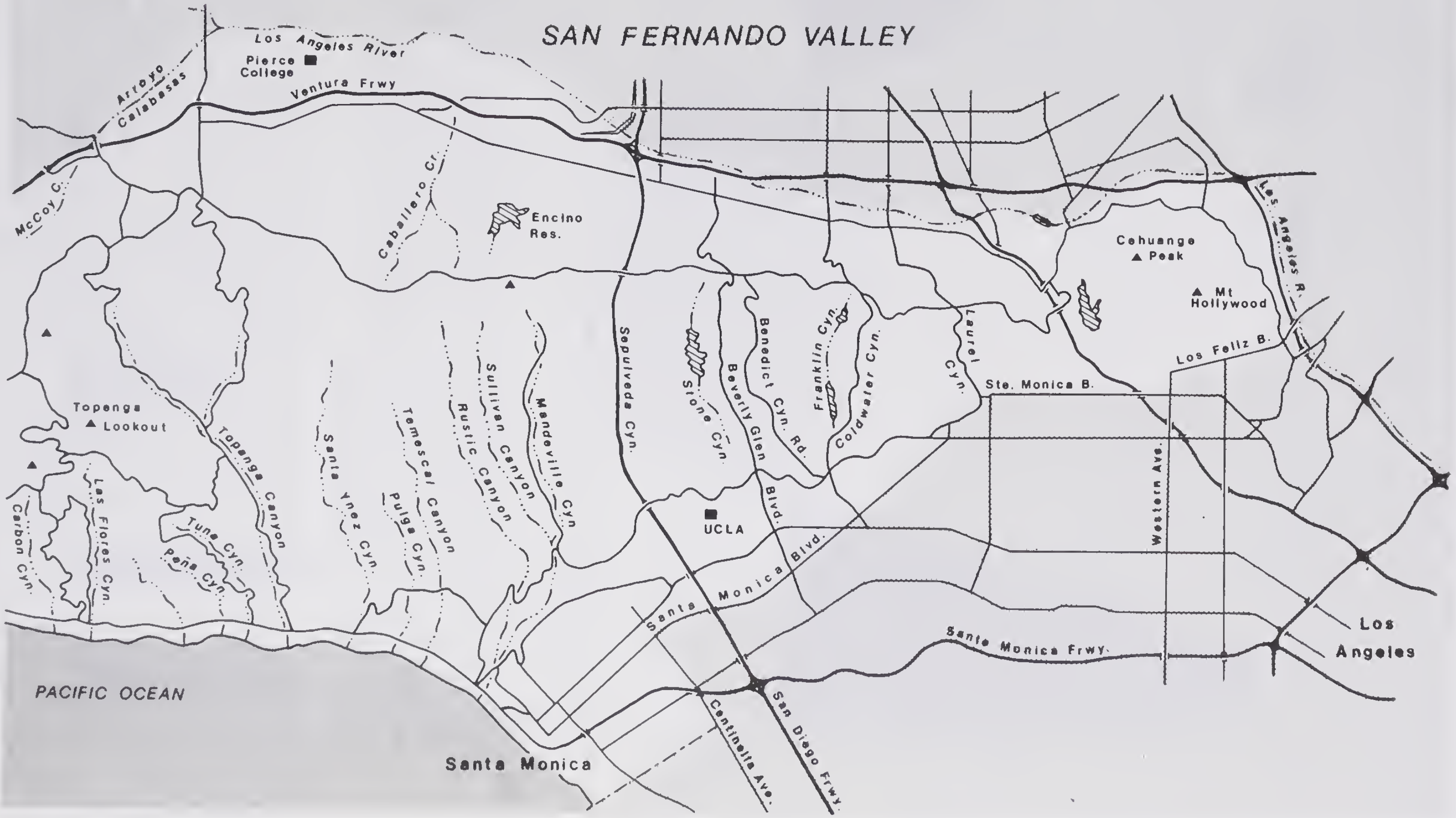


Figure 1 *(cont'd).*

Santa Monica Mountains

Eastern portion



California but also in all areas with a Mediterranean climate. The convergences are especially pronounced among the Mediterranean region, central Chile, and California (Mooney et al 1977b; Parsons 1976; Parsons & Moldenke 1975; Naveh & Whittaker 1979), but between these three regions and South Africa or Southwest Australia the convergence is slight (Cowling & Campbell 1980; Naveh & Whittaker 1979). Low nutrient soils of the latter two regions may be an overriding factor, obscuring the effect of the Mediterranean climate (Naveh & Whittaker 1979, Boucher & Moll 1981).

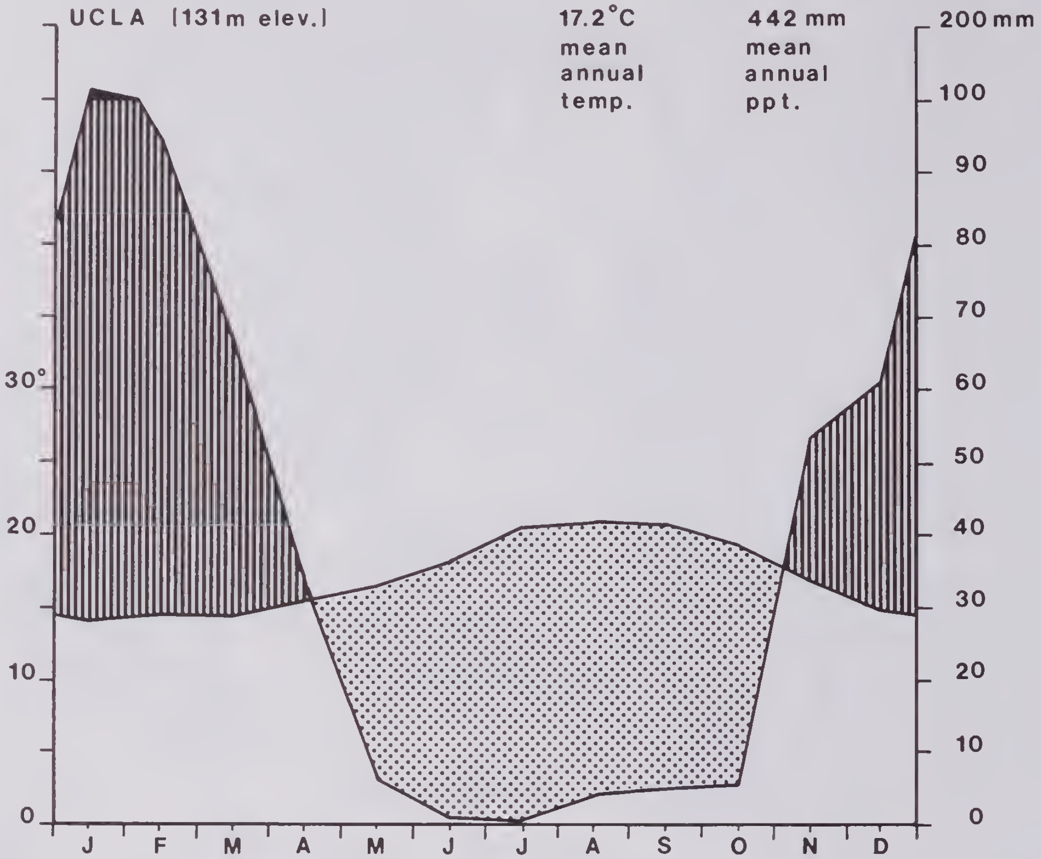


Figure 2. Climatic diagram for UCLA. Abscissa = months; each division of ordinate = 5°C (left scale) or 10 mm of precipitation for 0-100 mm, except above 100 mm of precipitation where each division = 100 mm of precipitation (right scale). The temperature curve is above the dotted area and below the vertically shaded area, and the precipitation curve is the other curve. Vertical shading = relative humidity. Black shading = precipitation greater than 100 mm. Dotted area = relative period of drought. Based on NOAA (1931-1980).

The dominant force in determining the weather of southern California is the Pacific High (Trewartha 1961, 1968; Sellers and Hill 1974; Bailey 1966). It is a semipermanent, subtropical high pressure cell over the eastern North Pacific Ocean between 30° and 40° N latitude. South of 30° N latitude are the humid, tropical trade winds, from which tropical storms that occasionally affect southern California in late summer are spawned, and north of 40° N latitude are the westerly storm paths (Gales 1974) that are the source of our winter storms. Because of adiabatic heating resulting from air subsidence in the Pacific High, the air mass over southern California is dry, warm, and stable. Anticyclonic air flow from the Pacific High, which results in our westerly and southwesterly winds, generally deflects approaching westerly storms away from southern California so that they cross over the Pacific Northwest instead of the Pacific Southwest. This results in clear, sunny skies except for seasonal coastal low clouds or fog primarily from May to July.

The position and intensity of the Pacific High, which changes with the seasons, largely determines whether moisture-laden air moves over southern California. However, a moisture-laden air mass alone does not result in precipitation. Precipitation depends on sufficient cooling of the moist air for water condensation to occur. Such cooling can occur adiabatically by topographic obstruction (orographic effect) or convergence with another air mass, thermal heating, which results in convection, or by contact with a cold mass. Almost all fall, winter, and spring precipitation depends on the southward or westward displacement and weakening of the Pacific High and the formation of a low pressure trough over the western United States. When this occurs, the jet stream and large scale cyclonic storms, which form in the Gulf of Alaska, dip southward and bring in moist unstable air over California, sometimes as far as southern California. These storms follow the prevailing air flow southward along the coast. Once the Pacific High has been displaced and weakened, it may remain so for a week or more or will be displaced and weakened several times in succession. Thus, several storms in succession may enter southern California within a week (Sellers and Hill 1974). Most of the precipitation in southern California comes from storms patterns of this sort.

During the El Niño/southern oscillation years, when global climatic patterns are disrupted and the Pacific High is weakened, southern California may experience more winter storms. This occurs when the Aleutian low pressure cell is very strongly developed and much farther south in the winter than normal and the jet stream is intensified and displaced southward, thus sometimes accounting for wetter than average winters (Rasmusson 1985). However, the historical correlation between El Niño/southern oscillation years and wet, stormy winters in southern California is not very impressive (Rasmusson & Wallace 1983).

Rarely southern California is hit by winter storms that are warmer than normal. These storms come in from the direction of the Hawaiian Islands (where they are known as "kona storms") and occur when the Pacific High is extremely far north and well developed in the winter. They become cutoff from the main westerly air currents to the North, and stagnate and intensify in the central Pacific Ocean before coming across the continent. By the time they reach southern California, they are well developed and capable of producing intense precipitation (Sellers & Hill 1974).

Very infrequently, coastal southern California receives rain in August and September (Fig. 3). This precipitation is a result of hurricanes that form in the Pacific and travel northeast toward the coast of Mexico. As they do, their intensity generally diminishes into that of a tropical storm. Although tropical storms seldom directly affect southern California, they occasionally travel far enough north to result in the influx of moist marine air into southern California.

The cool ocean water, which ranges from 10° to 24° C (Gale 1974), is an important force that greatly modifies the hot, dry descending air of the Pacific High. Thus, air temperatures are lower and humidity is higher along coastal southern California. It often results in a layer of cool,

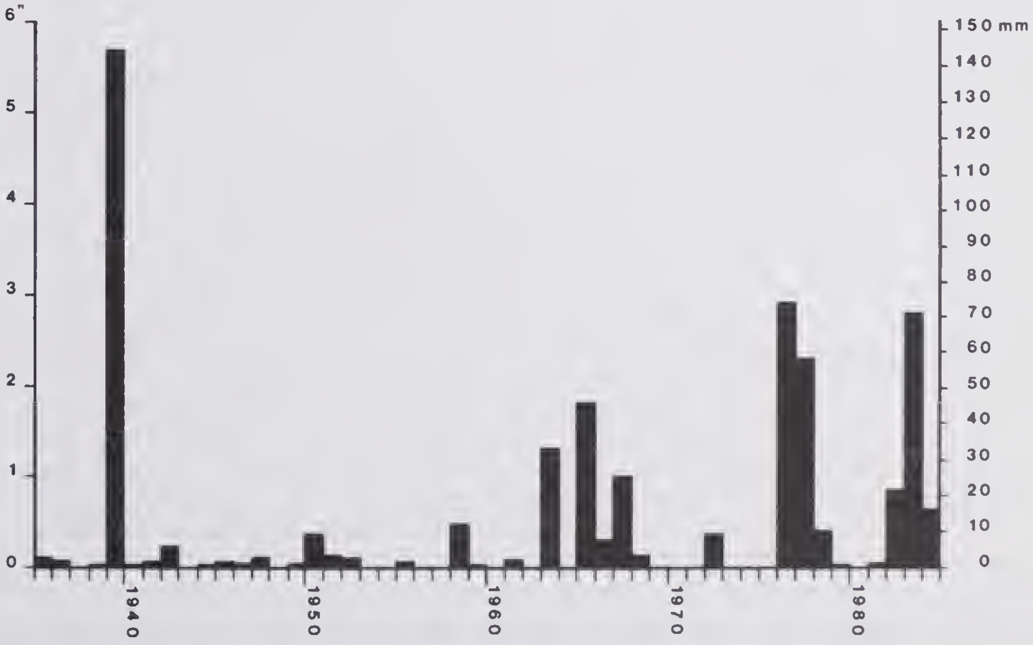


Figure 3. Annual variation in total precipitation for the two month period of August and September for Los Angeles Civic Center (NOAA 1935-1984).

moist air, the marine layer, over the ocean and the coastal regions. This marine layer has a temperature similar to that of the ocean, and air turbulence within the layer results in cool temperatures to about 2000 feet (Bailey 1966). This marine layer is often trapped by descending warmer air of the Pacific High which results in a temperature inversion. It is in this marine layer that fog and low clouds, as well as smog, are formed. This marine layer has a significant moderating effect on the climate of the Santa Monica Mountains, reducing insolation and, therefore, evaporation and transpiration. The marine layer moves inland with the daily sea breezes bringing the fog and low clouds. May and June in southern California have the most persistent cloudiness, sometimes lasting up to a week at a time. This is a transitional time (Gales 1974) that favors cloudiness when ocean temperatures continue to be cool and the desert is becoming hot. The former is favorable for cloudiness, and the latter is favorable for strong sea breezes. At this time the marine layer is often 3000 to 5000 feet thick, while it is only half that depth in summer (Gales 1974).

Wind is a result of differences in pressure and temperature. For southern California it is primarily due to differences in pressure and temperature between the coast and desert. Rising air in the hot inland valleys and deserts draws a layer of cool coastal air inland, the depth varying from day to day depending upon the broad scale weather patterns. When the interior is cool, as in the winter half of the year, temperatures have a minor role as compared to the pressure differences in controlling the flow. Topography and height of the temperature inversion are local influences on air flow (Gales 1974).

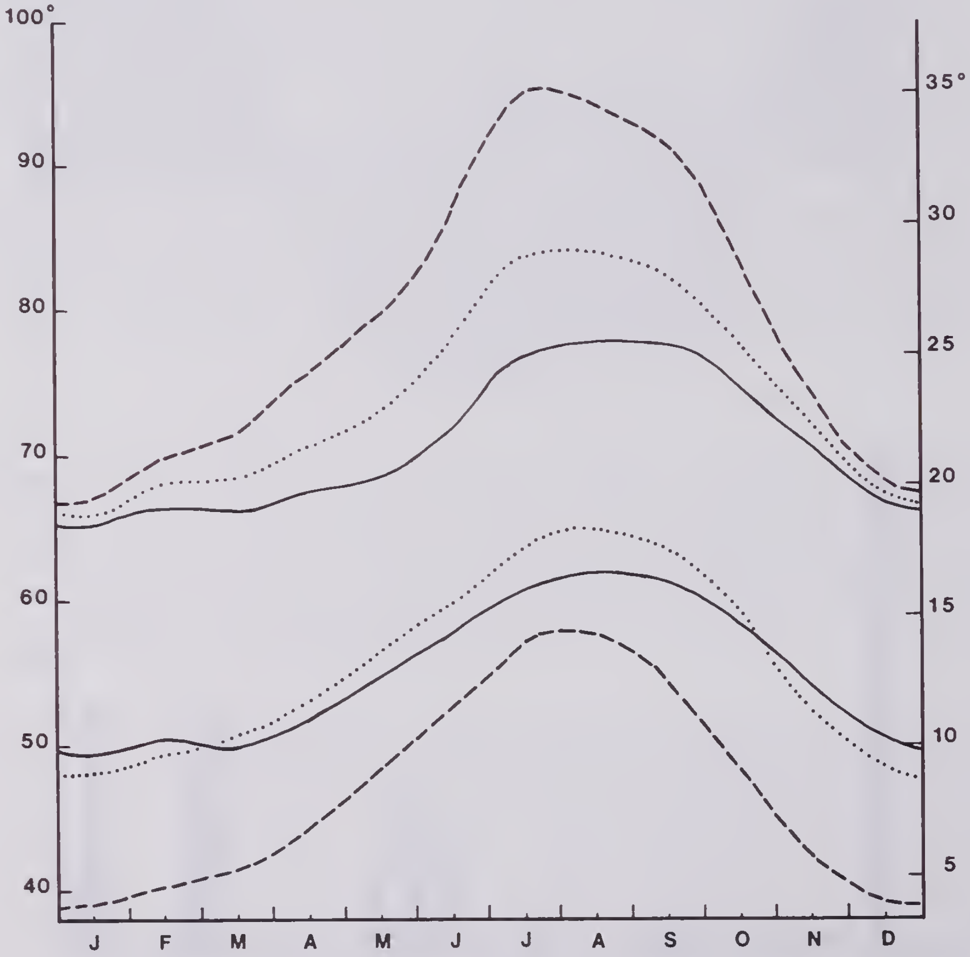


Figure 4. Mean monthly maximum and minimum temperatures (NOAA 1984) for Los Angeles Civic Center (··········); Pierce College, Canoga Park (— — — —); and UCLA (————). Abscissa = months; ordinate = temperature, left scale = °F, and right scale = °C.

As a result of cool-season storms that come across the western states, there is often an accumulation of air which forms a high pressure cell over the Intermountain Region. Further eastward movement of these storms is often blocked by the Rocky Mountains and the Canadian High over the north central states and central Canada. Air flow from this high results in northeasterly winds over the Mojave Desert that develop into Santa Ana winds of coastal southern California. These winds often deflect other storms approaching from the Pacific Ocean leaving southern California relatively clear (Bailey 1966).

Climatolgical data for the Santa Monica Mountains is surprisingly scanty, considering the large metropolitan area around the range. The general pattern of rainfall and temperature for UCLA (Fig. 2) is typical for all areas of the Santa Monica Mountains although higher elevations are wetter and generally cooler with increasing elevation, except during periods of temperature inversions when the inversion layer is low. Inland sites are slightly warmer than coastal sites with respect to daily mean temperature, but they have colder minimum and hotter maximum temperatures than similar elevations on the coastal slopes (Fig. 4). Mean daily minima and maxima for the inland site of Pierce College, Canoga Park [240 m (790 feet)], are 8.4°C (47.1°F) and 26.5°C (79.8°F) respectively, while at the coastal site of UCLA these values are 12.8°C (55.1°F) and 21.5°C (70.8°F) respectively. Frost is very rare on the low elevation coastal slopes but is much more frequent at higher elevations and at inland sites where at Pierce College it averages 19 days per year.

Annual precipitation at the lower coastal-facing elevations is about 370 mm (14.5 inches) [369 mm at Oxnard on the western end of the range and 372 mm at Los Angeles Civic Center on the eastern end of the range]. On the inland side annual precipitation is 406 mm (16 inches) at Pierce College. Higher elevations on coastal-facing slopes are wetter but the only data that is available is from the Topanga Patrol station at 227 m (745 feet) which reports an annual precipitation of 630 mm (24.8 inches). Precipitation is almost completely as rain. Very rare snow falls may occur at the higher elevations during the winter months, and occasionally sleet or hail falls.

GEOLOGY

A brief discussion of the geology is presented here to provide an elementary geological background that may aid in the interpretation of plant distributions and species diversity. Many plants for competitive-physiological reasons are either restricted to a specific substrate or are more common on one substrate than on others. Thus, abrupt changes in the species composition can often be accounted for by equally abrupt changes in substrate. Also, differences in vegetation between areas of similar exposure and slope is often the result of substrate differences. Diversity of substrates also increases the diversity of habitats and is one of the parameters, along with area, elevational range, topography, latitude, and geographic location, that determines species richness of an area. No attempt is made to outline the mechanisms of the geological events or to map the substrates. For this information the reader is referred to the geological maps by Durrell (1954), Truex and Hall (1969) and Yerkes and Campbell (1980) and cited literature. For a time reference and location on an east-west gradient the stratigraphy is diagrammed in Fig. 5.

The Santa Monica Mountains are a young range that has been uplifted to its present height since the middle Pliocene (Bailey & Jahns 1954, Dibblee 1982). It is composed of relatively young, often highly deformed, formations of Jurassic age or younger. These formations are sedimentary (primarily marine but also some terrestrial) and volcanic (extrusive and intrusive) deposits that overlie a basement platform of metamorphic and plutonic rocks (Dibblee 1982). The basement rocks are only exposed in the central and eastern part of the range and are composed of slates, schists and granites. The geology is complex due to dense faulting and difficult structural and tectonic interpretations, and lack of contiguous exposures (Dibblee 1982). There is a moderate diversity of exposed rock types that provide different parental and subsequently derived substrates and soils. The major substrates are sandstones, volcanics, crystalline granites, shales, slates, and conglomerates. Of the edaphically interesting substrates like serpentine, gypsum, and limestone, there are only a few small areas of limestone.

The oldest rocks exposed in the Santa Monica Mountains are the Santa Monica slates, a metamorphic, marine sedimentary rock of middle Mesozoic age (Dibblee 1982, Hoots 1931). They are the basement rocks for the western and central Santa Monica Mountains and are composed of slates and schists which are primarily of fine-grained mica but also include minute grains of quartz and feldspar (Hoots 1931). They are exposed extensively in the central part of the range east of Topanga Canyon, and comprise about a fourth of the surface area of the Santa Monica Mountains (Hoots

1931). Exposed surfaces of Santa Monica slate weatner to a brown color due to limonite deposited by percolating water along joints and bedding or cleavage planes, but freshly fractured rocks are dark or bluish gray or black. In many places the slate has been altered to phyllite and fine grained schist by contact metamorphism induced by granitic intrusions (Hoots 1931).

Three periods of granitic intrusions, which occurred during the middle to late Mesozoic, are mapped by Neuerburg (1953). These intrusions form the basement rocks for the eastern end of the range (Neuerburg 1953) and are exposed in an area northwest of Hollywood and around Cahuenga Peak. They are primarily composed of highly weathered quartz diorite and granodiorite.

Subsequent to the granitic intrusions, the Santa Monica slate was uplifted and gradually eroded until late in the Cretaceous (Hoots 1931). From then to the late Miocene there was almost continuous deposition of sediments, primarily marine but initially the deposits were terrestrial and later there were occasional, short periods of terrestrial deposition. Only in the middle Miocene was this sedimentary phase disrupted, and then by a period of massive volcanic deposition in the western Santa Monica Mountains (Dibblee 1982).

The sediments from the late Cretaceous to the middle Miocene are composed of varying proportions of sandstones, conglomerates and very fine-grained rocks (shales, siltstones, and mudstones). The formations of this time span are the "Trabuco", Tuna Canyon (Chico), Simi, Coal Canyon

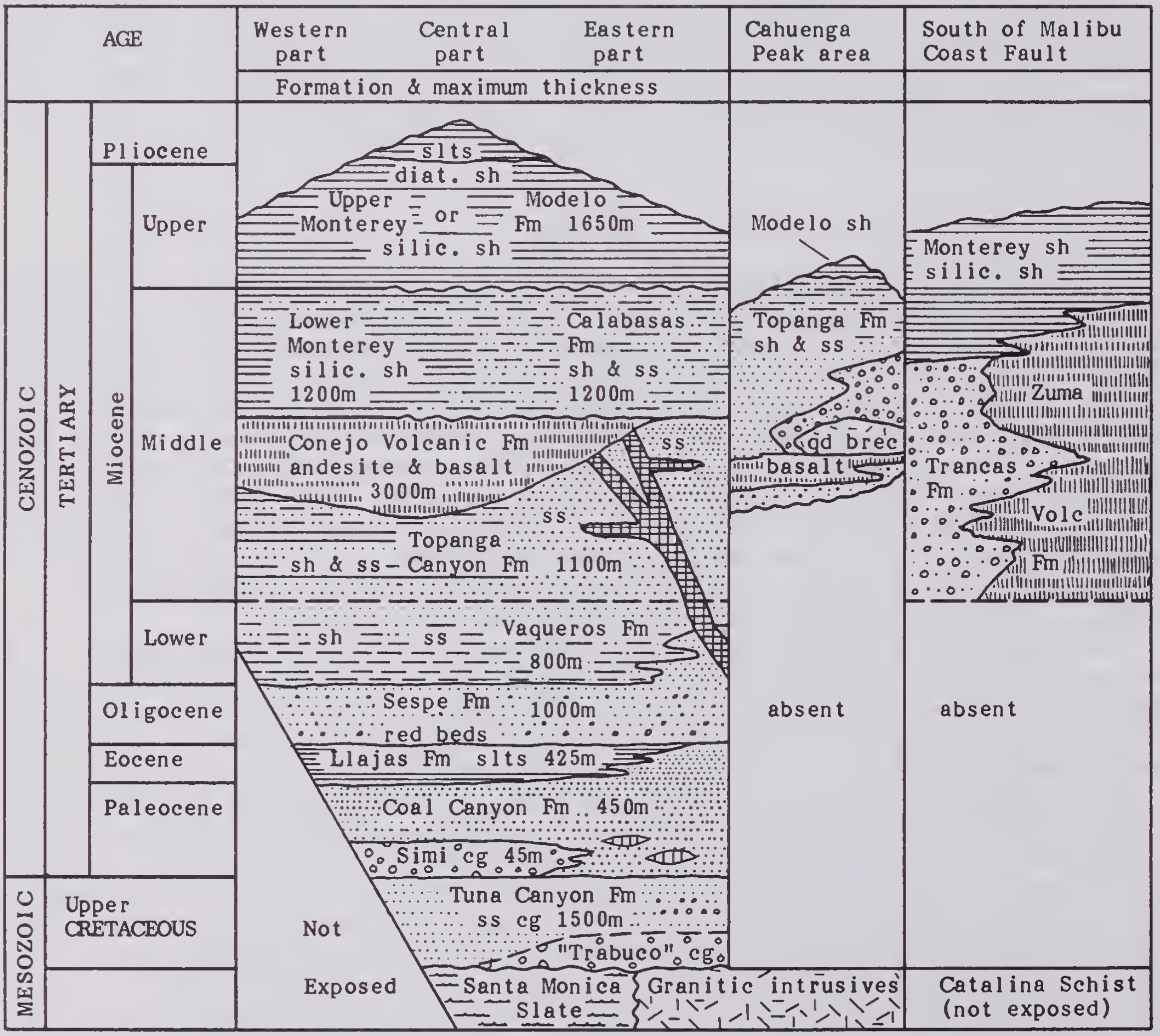


Figure 5. Stratigraphy of the Santa Monica Mountains (redrawn with minor modification from Dibblee 1982). Fm = Formation, brec = breccia, diat. = diatomaceous, qd = quartz diorite, sh = shales, slts = siltstones, silic = siliceous, and ss = sandstone.

(Martinez), Llajas(?), Sespe, Vaqueros, Topanga Canyon (Lower Topanga), and Calabasas (Upper Topanga). The conglomerates occur in the earlier formations upto and including the Llajas(?) Formation. They are composed of porphyritic and aphanitic igneous rocks (granites, gneisses, quartzites) and sedimentary rocks (slate and argillite) in a sandy, clayey, or graywacke matrix (Dibblee 1982). Early conglomerates (Trabuco Formation) are believed to be derived from the eastern Santa Monica Mountains and later conglomerates (Tuna Canyon Formation) were derived from similar rocks as those in the eastern Santa Monica Mountains but from the south; perhaps the Peninsular Ranges prior to movement on the Malibu-Santa Monica Fault (Colburn et al 1981, Dibblee 1982). Some of the conglomerates are terrestrial and others are marine deposits. Except for those of the Sespe Formation, the sandstones are primarily marine arkosic deposits (sandstone with unweathered feldspar usually derived from granite) varying in color from light gray to tan (Dibblee 1982). The Sespe Formation is composed of red, pink or light gray, arkosic sandstones of terrestrial origin. The sandstones are present in all the formations except the Trabuco, Simi, and Llajas(?) formations. Shales, siltstones and mudstones are interbedded with the sandstones and conglomerates in all the sedimentary formations except the Trabuco and Simi formations (Dibblee 1982). Limestones are rare in the Santa Monica Mountains but in Santa Ynez Canyon area (Coal Canyon Formation) there are prominent but discontinous reefs of gray white algal limestone (Hoots 1931).

For about 2 million years in the middle Miocene, there were periods of extrusive and intrusive submarine volcanism which were preceded by significant local deformations (Yerkes and Campbell 1979). Volcanic rocks of this period are named the Conejo Volcanics and are composed of alternating layers of andesitic and basaltic flow-breccias, mudflow-breccias, flows, pillow-breccia, and aquagene tuffs, that overlie the Topanga Canyon Formation (Yerkes and Campbell 1979). Volcanic rocks from this period make up a significant amount of the exposed rocks in the western Santa Monica Mountains. Volcanic rocks occur in only a few places east of Topanga Canyon. Basalt occurs in Cahuenga Pass and in Brush Canyon between Cahuenga Peak and Mount Hollywood. Layers of possibly bentonite (clay formed from weathered volcanic ash) are found in the eastern Santa Monica Mountains.

Marine sedimentation was apparently continuous throughout this volcanic period in the eastern portion of the range. There shales, sandstones, and conglomerates of the Topanga Formation were deposited. Subsequent to the Conejo Volcanics are sandstones, siltstone and sedimentary breccias of the Calabasas Formation of the central and western Santa Monica Mountains (Yerkes and Campbell 1979). This period of sedimentation was followed by uplift, erosion, and subsidence.

The Modelo Formation (upper Monterey Shale) of the upper Miocene, which rests unconformably on the Calabasas Formation, consists of soft, earthy shales or soft, white diatomaceous shales of marine origin (Dibblee 1982). It is extensively exposed along the north slopes of the eastern Santa Monica Mountains to Thousand Oaks, and is also on the southern slopes (Hoots 1931). They are commonly grass covered (Sharp 1978). Within the lower part of this formation are some tan arkosic sandstone units which are thickest and most abundant in the eastern part of the range (Dibblee 1982). These are interpreted as deep sea fan deposits deposited by turbidity currents.

The geology of the area south of the Malibu Coast Fault is different from the rest of the Santa Monica Mountains (Yerkes and Campbell 1979). This area includes the immediate coast west of Carbon Canyon and the peninsula of Point Dume. The formations are poorly exposed and highly deformed (Yerkes and Campbell 1979). In this area there are three formation, Trancas and Zuma formations, which do not occur in the rest of the mountain range, and the Monterey Formation. The Trancas Formation is a heterogeneous mixture of sedimentary marine rocks that consist of sandstones, mudstones, siltshale, claystone and breccia. This formation is of lower to middle Miocene Age and is unconformably overlain by Monterey Shale. The Zuma Formation underlays the Monterey Shale and interdigitates with the Trancas Formation. It is volcanic and consists of basaltic and andesitic flows, breccias, pillow lavas, mudflow breccias, and aquagene tuffs. This volcanic sequence is early to middle Miocene Age and is similar to and correlative with the Conejo Volcanics (Yerkes and Campbell 1979).

During the Pliocene the Santa Monica Mountains were uplifted to their present form and eroded (Bailey & Jahns 1954, Dibblee 1982). There are no Pliocene formations exposed in the range. However, within the boundaries of the flora, Pliocene rocks are exposed in the Pacific Palisades where deep canyons have been cut through the thick Pleistocene alluvium and down into the Pliocene formation. They are composed of soft claystone, siltstone and sandstones (Dibblee 1982).

During the Quaternary, the range was reelevated and has been in an erosional-uplift cycle throughout this period. As in the Pliocene, extensive alluvial fans have been deposited surrounding the range in the Los Angeles Basin, San Fernando Valley and the Oxnard Plain. On the south side of the range these alluvial fans probably once formed an extensive coastal plain along the coastal edge of the Santa Monica Mountains, but the constant pounding of the ocean has eroded most of these alluvial deposits. Where they still occur, as at Malibu Creek and Point Dume, there are some sandy marine terraces that represent former shorelines. Three marine terraces are recognized in the range -- Dume (oldest), Corral, and Malibu (youngest). These terraces were formed when sea levels were high during the Pleistocene, and they have subsequently been uplifted to their present elevation (Birkeland 1972).

VEGETATION

The terrestrial vegetation of the Santa Monica Mountains can be divided up into chaparral; coastal sage scrub; southern oak woodland; valley grassland; riparian woodland; intermittent streambed; lake, pond, and quiet stream aquatic; freshwater marsh; coastal strand; and coastal salt marsh. In addition to these, two marine communities, surfweed and marine meadow, are included. The boundary between communities is not always sharp, and the transition from one community to another can be a subtle replacement of species of one community with those of another over an environmental gradient. In some areas, either because of disturbance factors (frequency or season of disturbance and time since last disturbance) or the mosaic nature of microclimatic or substrate parameters, the vegetation may be intermediate between two communities and, therefore, difficult to classify into one of the plant communities presented here. Difficulty may also occur in placing a plant association that does not cover a large enough area to be given formal recognition. The following discussion is a brief description of the communities as they occur in the Santa Monica Mountains. Following each community discussion is an aphabetical list of some of the pertinent literature on that community.

Chaparral (Fig. 6 & 7)

The chaparral community is composed of deep rooted, hard-leaved, evergreen shrubs, 2 to 4 m tall, that form an impenetrable woody vegetation. There is little or no understory layer but there is often an accumulation of dried leaf litter. The name is derived from the spanish word 'chaparro' which means little oak and is in turn derived from 'chabarra', a Basque word for dwarf, evergreen oak (Cronemiller 1942). This community occurs on dry rocky, gravelly slopes with little soil or on fairly heavy soils. Substrates are usually rockier than those of oak woodland or grasslands and rockier and moister than those of coastal sage scrub. The community is fire adapted, primarily by stump sprouting and, to a lesser degree, by seed germination after fire. There is often a high density of annuals during the spring after a fire, and bulbiferous plants can be quite conspicuous also at this time.

Characteristic species are: Adenostoma fasciculatum, A. sparsifolium, Ceanothus spp., Quercus dumosa, Q. agrifolia, Arctostaphylos glauca, A. glandulosa, Cercocarpus betuloides, Heteromeles arbutifolia, Fraxinus dipetala, Prunus ilicifolia, Rhamnus illicifolia, Rhus ovata, Dendromecon rigida, Garrya veatchiana, and Leptodactylon californicum.

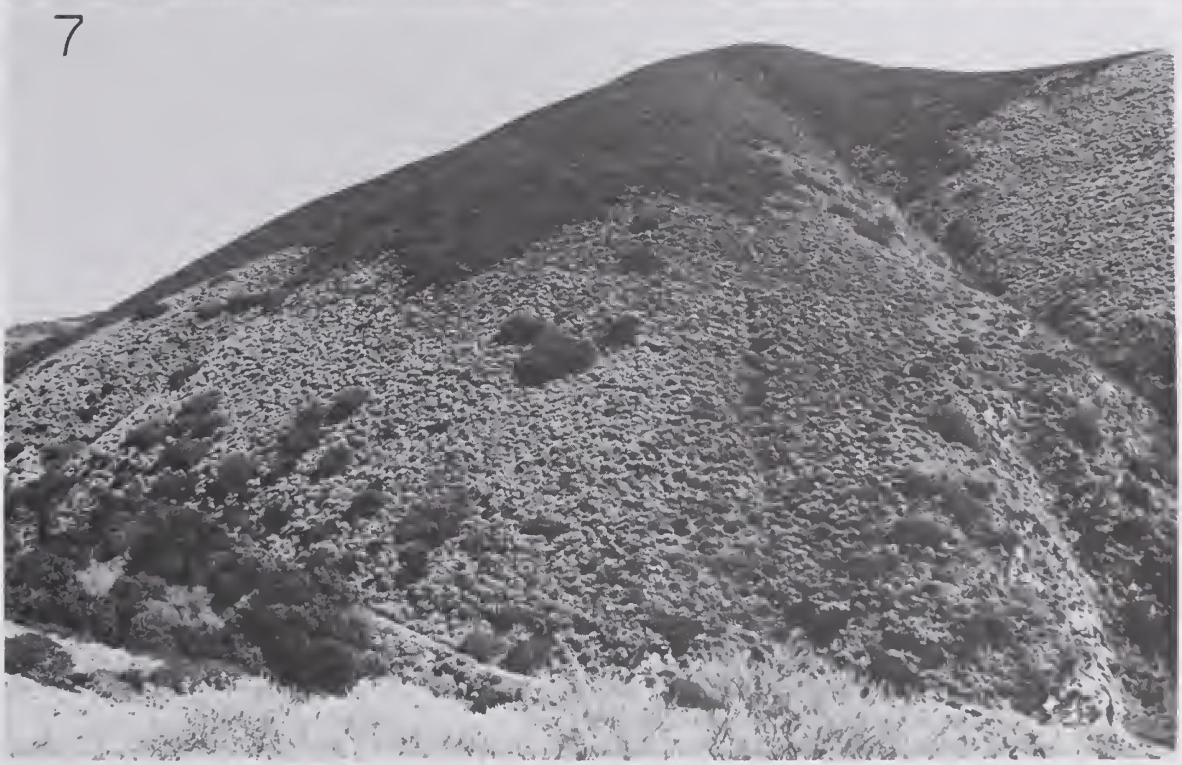
Several plant associations within this community can be recognized depending on the dominant species. These associations may be a reflection of slightly different environmental conditions or different stages of succession after a fire. These are: mixed chaparral, a diverse assemblage of species; ceanothus chaparral, common in recently burned chaparral; chamise chaparral, common on drier ridges and south-facing slopes; red shank chaparral, also on drier slopes and ridges; and oak chaparral, moister, generally north-facing slopes. (Hanes 1977, Munz 1959, Thorne 1976).

Coastal Sage Scrub (Fig. 7 & 8)

Coastal sage scrub is characterized by subligneous, soft-leaved, aromatic shrubs from 0.5 to 2.0 m tall. The shrubs are not as dense or rigid as those of chaparral. Bare ground is typical between and below shrubs, crowns of the shrubs are often touching. Growth occurs in late winter and spring following the winter rains. Plants are usually dormant in summer and fall. Many of the species are adapted to avoiding the long period of summer drought by shedding their leaves or by reducing leaf area through the production of smaller leaves and the loss of larger, older leaves as water becomes limited, and a few species store water in their succulent stems or leaves. Coastal sage scrub generally occurs on drier sites and generally lower elevations than those of chaparral and is found on a complete range of slope and aspect although it occurs more extensively on steep south-facing slopes. The community is fire adapted primarily through seed germination after fire.

6

7



Figures 6 & 7. **-6.** Chaparral in upper Zuma Canyon; elevation of peak in center is 2015 ft. **-7.** Coastal sage scrub on lower slopes, ceanothus chaparral on higher slopes, and riparian woodland in bottom of La Jolla Canyon.

Characteristic species are: Artemisia californica, Salvia apiana, S. leucophylla, S. mellifera, Malosma laurina, Encelia californica, Diplacus longiflorus, Venegasia carpesioides, Eriogonum fasciculatum, E. cinereum, E. parvifolium, Eriophyllum confertiflorum, Elymus canadensis, Lotus scoparius, Baccharis pilularis, Opuntia littoralis, and Yucca whipplei.

As with chaparral several associations within this community can be recognized. Kirkpatrick and Hutchinson (1977) have recognized 11 associations throughout the range of coastal sage scrub based on the physiognomic structure and species dominance. Of these 11 associations they recognize the following in the Santa Monica Mountains: Artemisia californica-Baccharis pilularis-Elymus condensatus, Salvia mellifera-Malosma laurina, Salvia leucophylla-Malosma laurina, Salvia leucophylla-Artemisia californica, Encelia californica-Artemisia californica. Other associations can also be recognized, especially in the western portion of the range. (Kirkpatrick and Hutchinson 1977, 1980; Mooney 1977b; Munz 1959; Thorne 1976; Westman 1981a, 1981b).

Southern Oak Woodland (Fig. 8)

The southern oak woodland is characterized by woody vegetation over 5 m tall and with tree cover greater than 30 per cent. It is best developed on north-facing slopes and shaded ravines in heavy clay soils. Some areas may be very dense and other areas may be more open with a grassland understory. On deep, well-drained soils or Modelo shales and clays in northern part of the range Quercus lobata replaces Q. agrifolia to form a phase of southern oak woodland that approaches the valley oak woodland of the San Joaquin Valley.

Characteristic species are: Quercus agrifolia, Q. lobata, Umbellularia californica, Juglans californica, Toxicodendron diversifolium, Heteromeles arbutifolia, Sambucus mexicana, Dryopteris arguta, etc. (Griffin 1977, Thorne 1976).

Valley Grassland (Fig. 9)

The grasslands that occur in the Santa Monica Mountains have been greatly altered. The major factors, in order of importance, that Heady (1977) attributes to the alteration of the California grasslands are the invasion of alien plant species, grazing pressure by domesticated animals, cultivation, and a decrease in the frequency and intensity of fires. The same factors probably account for the change in the species composition of the grassland in the Santa Monica Mountains. The community still persists as a grassland, but the native perennial bunch grasses have largely been replaced by weedy species primarily from Europe. The grassland can be on fairly steep slopes or flats and is often sparsely dotted by oak trees (Quercus agrifolia and Q. lobata). It occurs predominantly in the northwestern part of the range, commonly on the Modelo formation of soft shale sediments and clay. Much of this area is hotter and drier than the coastal facing slopes of the range. The community is well developed in the La Jolla Valley at the western end of the range although most of that vally was cultivated by early settlers. Grasslands also form the understory of the southern oak woodland.

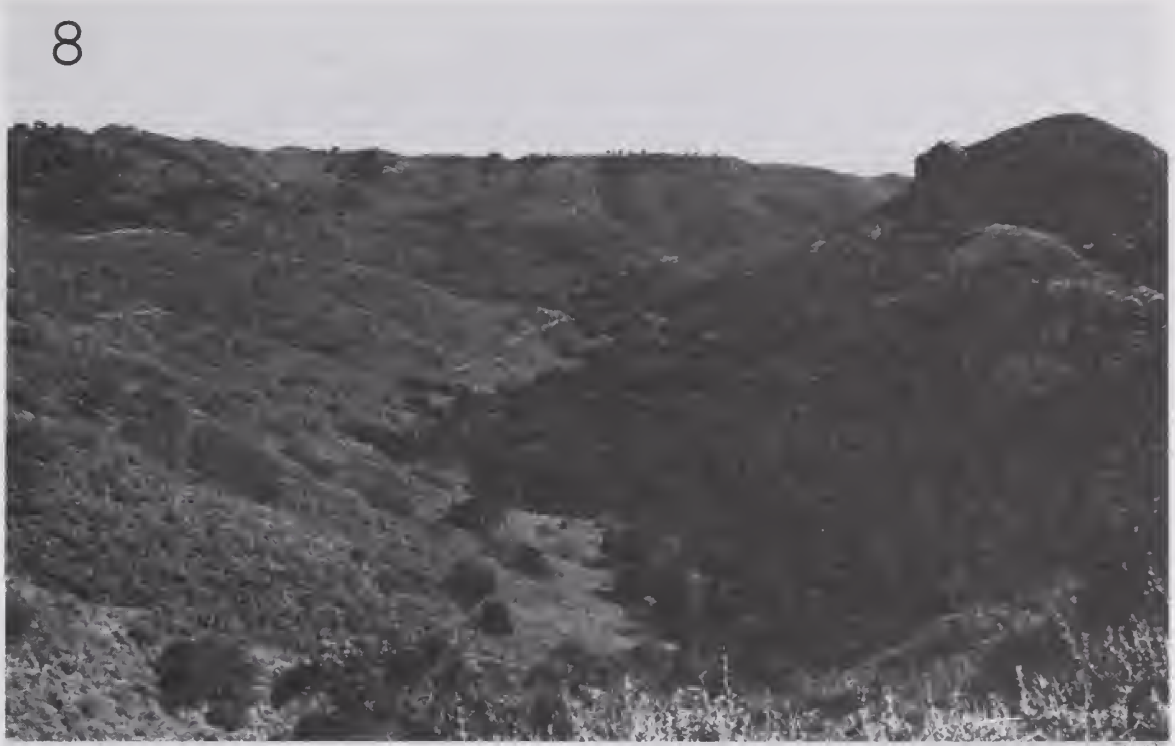
Characteristic species are: Stipa pulchra, S. lepida, Avena fatua, A. barbata, Brassica nigra, Hordeum murinum glaucum, H. murinum leporinum, Poa annua, Bromus mollis, B. rubens, B. rigidus, Lolium perenne, Sonchus asper, S. oleraceus, Calochortus catalinaea, Hemizonia fasciculata, Sisrynchium bellum, Dichelostemma pulchellum, Orthocarpus purpurascens, Centaurea mellitensis, Nemophila menziesii, Erodium spp., Lupinus spp., etc. (Heady 1977).

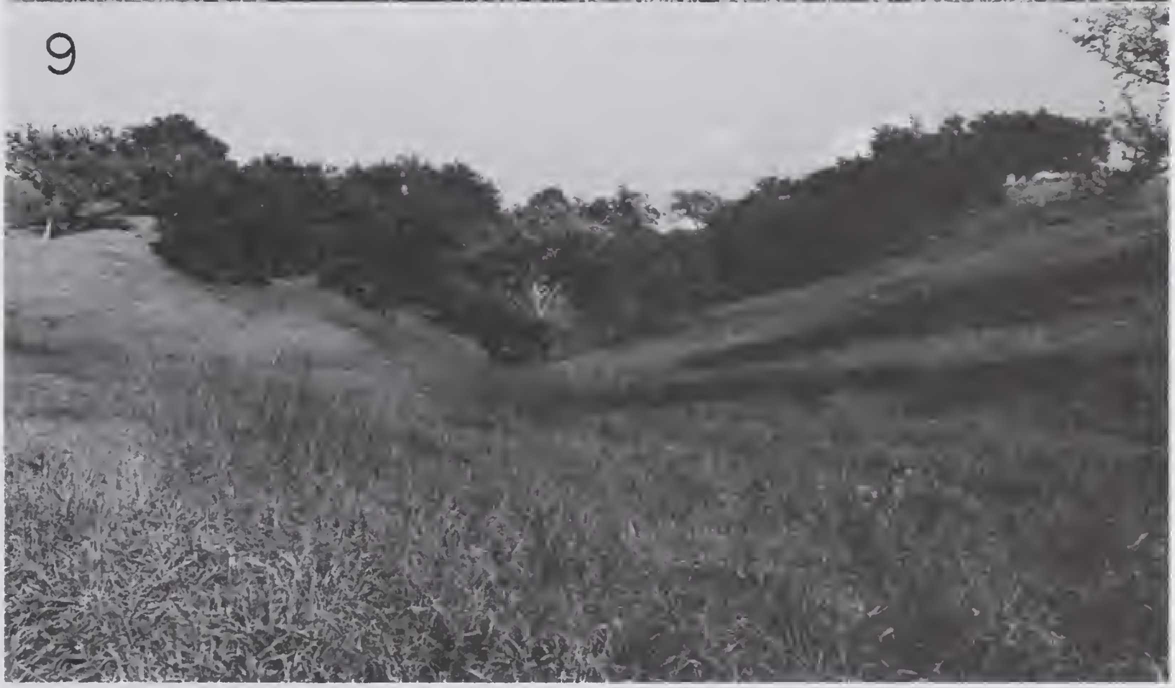
Riparian Woodland (Fig. 10)

The riparian woodland occurs along canyon and valley bottoms where there is a perennial or seasonal stream and upward from the stream where there exists favorable soil moisture. It also occurs along the margins of some of our man-made lakes and reservoirs. Within the woodland there is a zonation of the plants reflecting the wetness of the various areas. Areas that are generally flooded during the winter and spring are characterized by Salix spp., Populus fremontii, P. trichocarpa, Alnus rhombifolia, Baccharis salicifolius, etc. The upland areas occur along the streams above the high water level and are dominated by trees. Characteristic species are: Platanus racemosus, Populus fremontii, P. trichocarpa, Salix spp., Acer macrophyllum, Epipactis gigantea, Toxicodendron diversiloba, Umbellularia californica, Rubus ursinus, etc. (Cowardin et al 1979, Thorne 1976).

Intermittent Streambed

The intermittent streambed community refers to plant associations that are composed of nonpersistent herbaceous plants within the banks of an intermittent stream or channel. Thus, it





Figures 8 & 9. **-8.** Coastal sage scrub on SW-facing slopes (left) and oak woodland on NE facing slopes (right) in Ramirez Canyon. **-9.** Valley Grassland in Las Virgenes Canyon with a small grove of ***Quercus agrifolia*** and ***Q. lobata***.

excludes the thickets of willows that are treated under riparian woodland. It is generally well developed along drainages where the gradient is low and the substrates are sandy or muddy. Characteristic species are: *Leptochloa uninervia*, *Carex* spp., *Cyperus eragrostis*, *Artemisia douglasii*, *Cyperus eragrostis*, *Rumex* spp., *Polygonum* spp., *Veronica anagallis-aquatica*, *Polypogon monspeliensis*, *Festuca arundinacea*, *F. pratensis*, *Apium graveolens*, *Agrostis semiverticillata*, *Mimulus cardinalis*, *Polygonum* spp., *Bidens laevis*, etc.

Lake, Pond, and Quiet Stream Aquatic

This aquatic community occurs in permanent bodies of nonpolluted, clear freshwater where the current is not too strong. Characteristic species are: *Elatine californica*, *Ludwigia peploides*, *Azolla filiculoides*, *Lemna* spp. *Nuphar luteum*, *Polygonum* spp., *Potamegeton pectinatus*, *P. crispus*, *Zanichellia palustris*, *Nasturtium officinale*, and *Ammannia coccinea*. (Thorne 1976).

Freshwater Marsh

The freshwater marsh occupies sites that are seasonally wet (either with standing water or only moist soil surface) with fresh or slightly brackish water. Characteristic species are *Typha latifolia*, *T. domingensis*, *Scirpus californicus*, *S. americanus*, *S. maritimus*, *Cyperus eragrostis*, *Solidago occidentalis*, *Anemopsis californica*, *Juncus* spp., *Lemna* spp., *Azolla filicoides*, *Anemopsis californica*, *Aster subulatus*, *Artemisia biennis*, etc. (Thorne 1976).

Coastal Strand

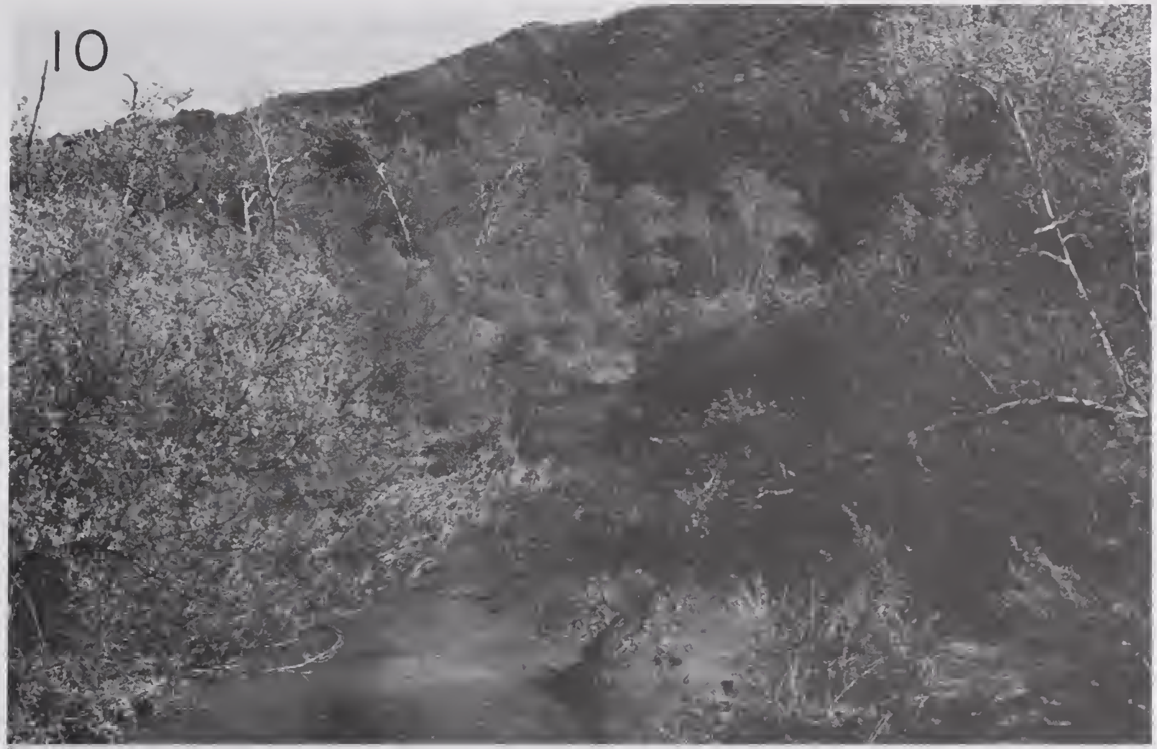
Coastal strand vegetation as considered here includes the plant associations that occur on the beaches and sand dunes. Not much of this habitat occurs in the Santa Monica Mountains since abrupt bluffs characterize most of the coastal front of the range. Most of the area that once supported coastal strand vegetation is now lost due to development or denuded of vegetation from heavy trampling and recreational use of our beaches and foredunes.

The coastal strand vegetation is sparse and of low species diversity. Species are generally evergreen, perennial, herbaceous, succulent, prostrate, and xerophytic. The microenvironmental factors of salt spray, mobile substrate, wind, and possible exposure to storm waves are very important and severe environment parameters that greatly limit the number species that can grow on beaches and coastal dunes (Barbour and Johnson 1977). Introduced species have probably significantly altered the frequency of native species (Barbour and Johnson 1977).

Typical species of the coastal strand are: *Ambrosia chamissonis*, *Abronia maritima*, *Atriplex leucophylla*, *Distichlis spicata*, *Carpobrotus aequilaterus*, *C. edulis*, *Mesembryanthemum crystalinum*, *Camissonia cheiranthifolia*, and *Cakile maritima*. (Barbour and Johnson 1977, Munz 1959).

Coastal Salt Marsh (Fig. 11)

Coastal salt marsh occurs in only two areas within the boundaries of the flora. These are at Mugu Lagoon and the mouth of Malibu Creek. The marsh at Mugu Lagoon is well developed and fairly extensive. The marsh at Malibu Creek is just a small patch. The coastal salt marsh is subject to periodic inundation by the tides. Depending on the frequency and duration of inundation and exposure, different vertical vegetation zones reflecting the environmental conditions can be recognized within the marsh. Usually two or three zones are recognized: lower, middle, and upper littoral zone (Vogl 1966, Henrickson 1976) or low and high marsh (MacDonald 1977). For the portion of the Mugu Marsh included in this flora, only the upper marsh or upper littoral zone is well developed. It has vegetation that is low and generally dense, composed of the following species: *Salicornia virginica*, *Arthrocnemum subterminale*, *Frankenia grandiflora*, *Monanthochoe littoralis*, *Distichlis spicata*, *Jaumea carnosa*, *Batis maritima*, *Limonium californicum*, and *Sueada californica*. Low marsh (lower littoral zone) normally is dominated by *Spartina foliosa*, a perennial grass, 1-1.5 m tall, and *Batis maritima* and *Salicornia virginica* may also be present in the low marsh. The low marsh is poorly developed at Mugu Lagoon, presumably due to habitat elimination resulting from past dredging activities (Zedler 1982). The middle littoral zone, if recognized, consists of *Salicornia bigelovii*, *Batis maritima*, and *Salicornia virginica*, and occasional plants of *Spartina foliosa*, *Triglochin concinna*, and *Frankenia grandiflora*. (Ferren 1985, Henrickson 1976, MacDonald 1977, Thorne 1976, Warme 1971, Zedler 1982).



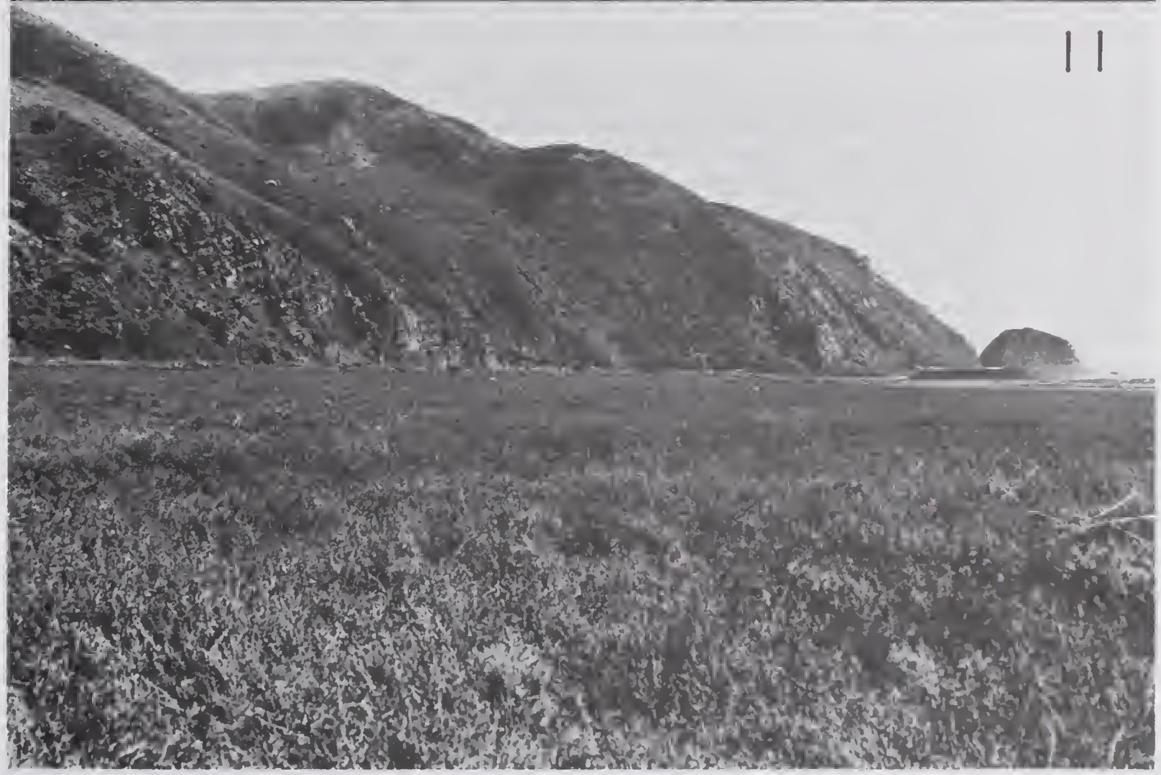


Figure 10 & 11. **-10.** Riparian woodland along Trancas Creek, elevation ca 740 ft. **-11.** Coastal salt marsh at Mugu Lagoon. Point Mugu is at right.

Marine Meadow

The marine meadow only occurs in our area in Mugu Lagoon where there is quiet marine water. Only one flowering plant, Zostera marina, occurs in this community. The other plants of this community are algae of the genera Cladophora, Enteromorpha, and Ulva. (Thorne 1976).

Surfweed

The surfweed community occurs along the rocky coast below low tide where there is heavy surf. Only plants that can withstand the physical force of the waves can survive here. Of the flowering plants there are only two -- Phyllospadix scouleri and P. torreyi. The other plants that make up this community are algae: sea-palms (Postelsia palmiformis and Eisenia arborea), kelps (Macrocystis pyrifera, Egregia laevigata, Hesperophycus harveyanus, Halidrys dioica, Pelvetia fastigiata), red algae (Plocamium cartilagineum and Corallina officinalis) and others. (Thorne 1976).

BIOLOGICAL SPECTRUM: LIFE-FORMS

The biological spectrum of a floristic unit is the relative number of species that occur in the various life-form categories and is useful for demonstrating the response of a floristic unit to environmental factors (Mueller-Dombois & Ellenberg 1974). One of the commonly used methods of measuring the response of a floristic unit is the life-form system of Raunkiaer (1934). It is ecologically oriented and is based on the position or height of the buds or organs from which new shoots or foliage develop after an unfavorable season. (The life-form categories are listed in the bottom of Table 1.) For our area the unfavorable season for most plants is the hot, dry summer, but for many other areas it is freezing cold of winter.

The basic idea behind the use of biological spectra is that for floristic units with similar environmental parameters, the biological spectra will also be similar despite the lack of taxonomic similarity. Although no one life-form is restricted to any one climatic regime and no one climatic regime is characterized by only one life form, there are a few simplified patterns that are revealed by the biological spectra (Raunkiaer 1934, Cain 1950). Warm, humid tropics are dominated by phanerophytes; temperate midlatitudes, by hemicryptophytes; cold high latitudes and altitudes, by chamaephytes; and dry tropical and subtropical deserts, by annuals. Thus a high percentage of phanerophytes are indicative of equatable climates; hemicryptophytes, of cold winters with warm, wet summers; chamaephytes, of severe cold winters with a short growing season; and annuals, of hot, dry summers. It is this correlation of biological spectrum with climate that is interesting. When climates are similar but the biological spectra are not, there is often an underlying factor, e.g. mineral deficiencies in the soil, thay may explain the lack of similarity.

The distribution of life-forms for the Santa Monica Mountains, along with some other Mediterranean climatic areas and Raunkiaer's Normal Sprectum is summarized in Table 1. (Placement of species in the categories, especially chamaephytes and hemicryptophytes, is not always easy, and some errors have undoubtedly been made. Hopefully errors have been compensating.) The most common life-forms of the Santa Monica Mountains are therophytes (annuals; 36%) and hemicryptophytes (plants that have vegetative buds at ground level during the unfavorable season; 29%) although only annuals are more common than Raunkiaer's normal spectrum. Both of these forms are well adapted to avoiding hot, dry summers. The therophytes escape as seeds, and hemicryptophytes protect buds by having them at ground level beneath litter. Woody plants (meso-, micro, and nanophanerophytes) compose only 15% of the species, well below the normal spectrum. Although with respect to species numbers the nanophanerophytes and microphanerophytes only compose 13% of the flora, they are the dominant life-form of coastal sage scrub and chaparral, which covers most of the area of the range. The representation of chamaephytes is about equal to Raunkiaer's normal spectrum and geophytes are slightly more prevalent in the Santa Monica Mountains than would be expected from Raunkiaer's normal spectrum. The other life-forms contribute only a minor part to the biological spectrum of the Santa Monica Mountains.

The distribution of life forms in the Santa Monica Mountains is very similar to that of mediterranean vegetation of the Mediterranean region, Chile, and, of course, southern California. These regions differ primarily from the normal spectrum by having a higher number of annuals and a lower number of woody shrubs and trees. There are considerable differences in the biological spectrum of the Santa Monica Mountains and that of southwestern Australia and South Africa. The kwongan of southwestern Australia and the fynbos of South Africa differ from southern California, Chile, and the Mediterranean region in that there are more chamaephytes and shrubs and fewer annuals, and the fynbos also differs in having many more geophytes. The paucity of annuals is a feature that is

Table 1. Biological spectrum of the Santa Monica Mountains compared with that from other areas with a Mediterranean climate and Raunkiaer's normal spectrum.

Floristic Unit	Total species	Percentage distribution of taxa among life-forms*											
		P	M	N	Li	Ch	H	G	Th	E	Pa	SS	HH
Raunkiaer's Normal Spectrum (1934)	400	6	17	20	0	9	27	3	13	3	0	1	1
Santa Monica Mtns. (native taxa)	640	2	5	8	<1	9	29	5	36	0	2	<1	2
Santa Monica Mtns. (total flora)	874	2	4	7	<1	8	28	4	42	0	<1	<1	2
Sta Catalina I., Calif. (native flora, Thorne 1967)	391	2	7	9	1	5	27	2	41	0	1	2	3
Sta Catalina I., Calif. (total flora, Thorne 1967)	557	1	6	8	1	3	27	2	48	0	1	1	2
California mediterranean areas (Shmida 1981)	307	4	7	13	2	14	29	3	27	0	<1	0	0
Chile coastal matorral (Mooney et al 1977)	109	(	12	)	-	15	17	9	46	-	-	-	-
Chile interior matorral (Mooney et al 1977)	108	(	24	)	-	14	20	6	36	-	-	-	-
Canary Islands (total flora Lems 1960)	1531	(4	)	15	1	16	17	5	36	0	-	1	1
Lowland of Madeira (Raunkiaer 1934)	213	0	1	14	-	7	24	0	51	0	-	0	3
Ferrara, Italy (Raunkiaer 1934)	657	(	8	)	-	3	39	15	35	-	-	-	-
Samos Id., Greece (Raunkiaer 1934)	400	1	4	4	-	13	32	11	33	0	-	0	2
Cyrenaica, Libya (Raunkiaer 1934)	375	1	1	7	-	14	19	8	50	0	-	0	0
Kwongan, SW Australia (Pate et al 1984)	429	(	26	)	-	51	13	8	2	-	-	-	-
Fynbos, South Africa (Naveh & Whittaker 1979)	?	(	32	)	1	(49	)	16	2	-	-	-	-
Stellenbosch Flats (Duthie in Boucher & Moll 1981)	678	-	4	18	-	15	11	35	13	-	-	-	5
Cape Flats (Acocks in Boucher & Moll 1981)	821	-	2	24	-	17	11	24	15	1	-	1	5

*P = mesophanerophytes (trees, 8-25 m tall); M = microphanerophytes (shrubs or small trees, 2-8 m tall; N = nanophanerophytes (small shrubs, 0.5-2 m tall); Li = climbing phanerophytes (lianas with persistent stems); Ch = chamaephytes (vegetative buds not over 0.5 m above the ground); H = Hemicryptophytes (vegetative buds at surface of soil); G = geophytes (vegetative buds below surface of the soil); Th = therophytes (annuals); E = epiphytes; Pa = parasites; SS = stem succulents; and HH = hydrophytes (aquatic plants, submersed or floating).

typical of regions with nutrient poor soils (Beadle 1966) like the kwongan and fynbos. Presumably, the short life span of annuals is not of adequate duration for the root system to capture the necessary nutrients required for growth, flowering and fruiting. Interestingly, the more fertile soils of South Africa do support more annuals as shown for the vegetation of the Stellenbosch and Cape flats (Table 1).

Although most of the species of the mediterranean type vegetation have some method of escaping stress by sacrificing, to various degrees, vegetative parts and going dormant, most of the shrubby vegetation is evergreen and endures the stress of summer. The shrubs of the mediterranean regions generally have either small, hard (sclerophyllous) leaves that are capable of enduring physiological stress without damage to tissues or have soft (malacophyllous) leaves that are abscised and replaced by smaller ones thereby reducing leaf surface area and thus tranpsiration as water stress increases and eventually the leaves may be completely lost. Those plants that do not have some way to escape or endure the hot dry summers are generally restricted to canyon bottoms and water courses or to north-facing slopes where water stress is not as severe. The life-forms of the Mediterranean climates are geared to either escaping physiological stress during the hot, dry summers or enduring physiological stress through physiological, anatomical, and morphological adaptations that minimize the effect of water stress.

STATISTICAL SUMMARY OF THE FLORA

The flora of the Santa Monica Mountain consists of 880 species, which is broken down in Table 2 into taxonomic categories and native versus introduced species. Based on total number of native species, a plot of species versus area (Fig. 12) for the California channel islands, the Santa Monica Mountains, some mainland areas illustrates that the number of native species is perhaps slightly less than would be expected. Using all regions plotted in Fig. 12, one would predict a total of 674 native species for the range. Thirty more species than included in this flora. Based only on the Channel Islands, one would predict only 424 native species, and if Anacapa and Guadalupe islands are excluded, 514 native species. The Santa Monica Mountains are floristically richer than the channel islands. Based only on the mainland sites and excluding the Santa Monica Mountains, a high value of 776 native species would be predicted. Excluding Marin County, which has an extraordinarily rich flora, from the calculations, 721 native species would be predicted, 77 more native species than recorded for the range. While the Santa Monica Mountains would not be expected to have an extremely rich flora because of the moderately low rainfall, lack of exceptionally high elevations, and lack of unusual substrates, there are probably still many more species of native plants to be found. (A statistical analysis of the above differences show that the only comparison that is significant is between the Santa Monica Mountains and all mainland sites excluding the Santa Monica Mountains.)

Table 2. Statistical breakdown of taxa in the flora of Santa Monica Mountains.

	family	genus	native species	introduced species	total species
LYCOPODOPHYTA	1	1	1	0	1
ARTHROPHYTA	1	1	3	0	3
PTEROPHYTA	7	13	16	0	16
CONIFEROPHYTA	1	1	1	0	1
ANTHOPHYTA					
Dicotyledoneae	83	344	527	166	693
Monocotyledoneae	16	80	96	70	166
TOTAL	108	440	644	236	880

Particularly impressive in Table 2 is that the introduced species compose 27% of the flora. Most of the introduced plants are species of the Poaceae (24%) and Asteraceae (14%). The most successful life-form of the introduced species is the annual habit (59%), and 61% of the introduced grasses are annuals and 68% of the introduced composites are annuals. Most of the rest of the introduced species are perennial herbs. The source region is primarily from the Mediterranean region with over 60% of the introduced species being native in that region. Not only have the annuals been successful in ruderal habitats but they have also been successful in grasslands or oak woodlands. The paucity of woody introductions (16 species) is notable. Of the woody introductions, most are not very invasive into the natural vegetation and are, therefore, generally restricted to ruderal habitats as is the case for **Spartium junceum**, **Nicotiana glauca**, **Schinus molle**, and **Eucalyptus globulus.** Even some of the taxa native to other areas of California and probably introduced into the Santa Monica Mountains, e.g. **Chrysothamnus nauseous**, **Atriplex polycarpa**, are also not very invasive, apparently being restricted to the immediate area where they were first introduced. The high proportion of introduced species is undoubtedly a function of the high degree of disturbance within the range, the proximity of seed sources for exotic, potentially weedy, plants (home gardens and lawns), the constant introduction of new exotic plants into home gardens, and the vulnerablitly of the flora, like the rest of the California flora, to invasion by Mediterranean species, especially annuals and species of the Poaceae or Asteraceae.

Only two taxa are endemic. These are **Dudleya verityi** and **D. cymosa** var. **marcescens. Eriogonum crocatum**, which was listed as endemic in earlier versions of the flora, is now known to occur just beyond the boundary of the range, northeast of Arroyo Conejo on volcanic outcrops.

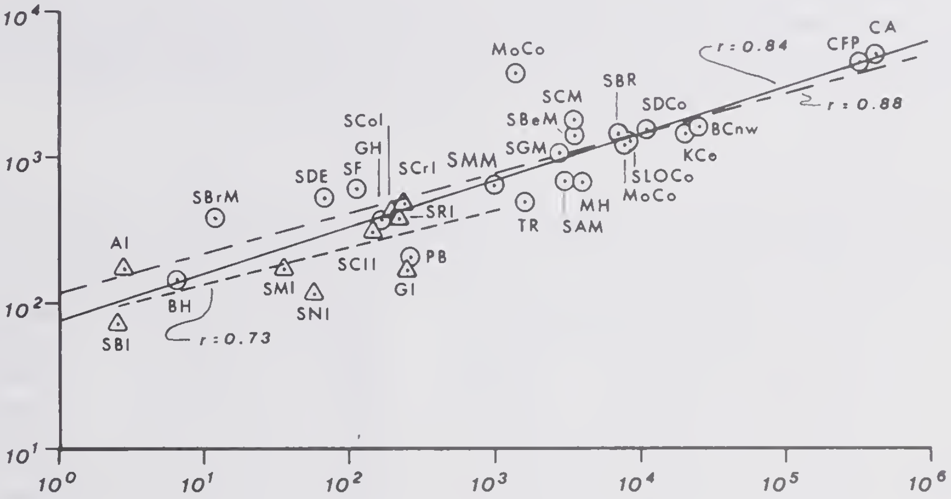


Figure 12. Native species-area plot and regression lines for the California channel islands (– – – – – –), mainland areas (— — —), and all areas (————). Abbreviations and sources are: channel islands (triangles) -- AI= Anacapa Island, GI = Guadalupe Island, SBI = Santa Barbara Island, SCaI = Santa Catalina Island, SCII = San Clemente Island, SCrI = Santa Cruz Island, SMI = San Miguel Island, SNI = San Nicolas Island, SRI = Santa Rosa Island (Wallace 1985 for all islands); mainland areas (circles) -- BH = Bodega Head (Barbour 1970), SBrM = San Bruno Mountain (McClintock & Knight 1968), SDE = San Dimas Experimental Station (Mooney & Parsons 1973), SF = San Francisco (Howell et al 1958), GH = Gavilan Hills (Boyd 1983), PB = Punta Banda (Mulroy et al 1974), TR = Temblor Range (Twisselmann 1956), Kern County (Twisselmann 1967), SMM = Santa Monica Mountains, SGM = San Gabriel Mountains (Thorne, pers. comm.), SBeM = San Bernardino Mountains (Thorne, pers. comm.), SCM = Santa Cruz Mountains (Thomas 1961), SLOCo = San Luis Obispo County (Hoover 1970), SBR = Santa Barbara Region (Smith 1976), MCo = Marin County (Howell 1970), CFP = California Floristic Province (Raven & Axelrod 1978), CA = California (Smith & Noldecke 1960, Munz 1959, Munz 1968 Raven & Axelrod 1978), Arizona (Kearney & Peebles 1960), and BCnw = northwestern Baja California (Thorne, pers. comm.), SDCo = San Diego County (Beauchamp 1986), SAM = Santa Ana Mountains (Lathrop & Thorne 1978), MH = Mount Hamilton (Sharsmith 1945), MoCo = Monterrey County (Howitt & Howell 1964).

Statistical Summary

For the following discussion the statisitics on the flora of the Santa Monica Mountains are compared with corresponding statistics for the California Floristic Province, the state of California, and the World. The California Floristic Province (CFP) consists primarily of the area west of the Sierra Nevada, Transverse and Peninsular ranges, or approximately cismontane California. It also includes a small portion of southwestern Oregon and northwestern Baja California. The eastern boundary of the CFP runs in a southeasterly direction from Coos Bay to Ashland, Oregon; southward to the town of Mount Shasta, California; southeasterly to Susanville; then southward along the eastside of the Sierra Nevada (including the Lake Tahoe angle of Nevada) to the Tehachapi Mountains where they meet the San Gabriel Mountains; eastward along the the north side of the San Gabriel and San Bernardino Mountains; around the eastern slopes of the San Bernardino Mountains; southward along the east side of the San Jacinto, Santa Rosa, and Cuyamaca mountains; across the U.S.-Mexico border into Baja California and southward along the Sierra Juarez and Sierra San Pedro Martir to the southern limit of chaparral; and then westward to the coast to about San Quentin. The western boundary is the Pacific Ocean with the exception that the coastal islands are also included (Howell 1957).

The Monocotyledoneae compose only 14.8% of the native flora of the Santa Monica Mountains. An extremely small percentage compared to the world percentage of 25.4% (Raven & Axelrod 1978). Even the flora of the State and the CFP have a higher percentage of Monocotyledoneae with 18.1 and 19.2%, respectively (Raven & Axelrod 1978).

The ten largest families for the Santa Monica Mountains are ranked in Table 3 by the total number of native species, which is also given as a percentage of the total native flora of the range (644 species). The percentage each family has in the native flora of the State of California and the CFP and the percentage of the total world flora are given for comparison. All these families are widely distributed except Onagraceae, which is mainly distributed in tropical to cool temperate regions and is most abundant and diversified in the western United States, and Polygonaceae, which is chiefly of north temperate regions (Cronquist 1981). The three largest families in the Santa Monica Mountains (Asteraceae, Poaceae, and Fabaceae) are also among the largest families in the world. Asteraceae is the largest family of flowering plants in the world and consists of ca 9.3% of

Table 3. Ten largest families in the Santa Monica Mountains, ranked by total number of native species, compared with their percentage of California and the California Floristic Province[1].

Family	Santa Monica Mountains			Percent[2] of California flora (5046)	Percent[2] of C F P flora (4452)	Percent[2] of World flora (215,000)
	Native Species	Total Species	Percent[2] of flora (644)			
Asteraceae	97	131	15.0	13.8	13.6	9.4
Poaceae	42	99	6.5	6.1	6.6	3.7
Fabaceae[3]	45	57	7.0	6.4	5.3	5.6/8.0[4]
Scrophulariaceae	33	36	5.1	5.7	5.5	1.9
Onagraceae	22	22	3.4	2.4	2.3	0.3
Brassicaceae	21	43	3.3	3.4	3.1	1.4
Hydrophyllaceae	21	21	3.3	1.8	2.2	0.1
Cyperaceae	19	21	2.9	3.8	4.3	1.9
Polygonaceae	18	25	2.8	3.8	3.5	0.5
Apiaceae	16	24	2.5	2.3	2.3	1.4

1. Floras and treatments consulted: Gould & Moran 1981 for Poaceae of Baja Califonia; Barneby 1964 for **Astragalus**, Raven 1969 for **Camissonia**, Munz & Keck 1959 for California, Peck 1961 for Oregon, Wiggins 1980 for Baja California, Cronquist 1981 for species per family.
2. Based on native species. Number in parentheses is the number of native species for area.
3. Fabaceae (Mimosoideae, Caesalpinoideae, Faboideae)
4. Faboideae/Fabaceae (Mimosoideae, Caesalpinoideae, Faboideae)

the world flora. The Asteraceae are very well represented in our flora, consisting of 15% of the flora. There are very few floristic provinces where the Asteraceae comprise that great a percentage of the flora. One region where it does is the Sonoran Desert (Shreve & Wiggins 1964). In addition to the Asteraceae, the Poaceae, Fabaceae, Onagraceae, Hydrophyllaceae, and Apiaceae are particularly well developed in the Santa Monica Mountains, at least their percentage of the flora is greater than that for the State of California or the CFP. The remaining families -- Scrophulariaceae, Brassicaceae, Cyperaceae, and Polygonaceae -- all have a higher percentage of the flora of California and the CFP than of the flora of the Santa Monica Mountains.

The largest genera for the flora of the Santa Monica Mountains are listed in Table 4. All of these genera except **Eriogonum, Haplopappus**, and **Ceanothus** make up a greater perecentage of the flora of the Santa Monica Mountains than they do of the flora of California and the CFP. While the percentage for **Ceanothus** and **Haplopappus** in the range is about the same as that in the state and the CFP, the percentage for **Eriogonum** in the range is less than that in the flora of the California and the CFP. **Eriogonum** is better developed in the Great Basin, Mojave Desert, and Sonoran Desert.

Notably under represented in the flora of the Santa Monica Mountains are the genera **Gilia, Cryptantha, Mimulus, Astragalus.** These are genera well represented in the California flora but primarily in the transmontane regions outside of the CFP. **Erigeron** and **Arctostaphylos** are also under represented in comparison to their representation in the state. They mainly occur at higher elevations than exist in the Santa Monica Mountains. **Carex**, one of the largest genera in the world and the largest genus in the state, is very poorly represented in the Santa Monica Mountains, presumably because of the paucity of cool, wet habitats.

Table 4. Thirteen largest genera in the Santa Monica Mountains and the percentage these genera have in the flora of California and the California Floristic Province.

Genus	Santa Monica Mountains			Percent of Calif Flora	Percent of C F P Flora
	Native Species	Total Species	Percent of Flora		
Phacelia	13	13	2.0	1.8	1.4
Lupinus	13	13	2.0	1.7	1.5
Lotus	10	11	1.6	0.7	0.7
Camissonia	10	10	1.6	0.8	0.7
Juncus	10	10	1.6	1.0	1.1
Trifolium	9	11	1.4	0.8	0.8
Gnaphalium	8	9	1.3	0.2	0.2
Eriogonum	8	8	1.3	2.1	1.5
Dudleya	8	8	1.3	0.4	0.7
Atriplex	6	10	0.9	0.6	0.5
Haplopappus	6	6	0.9	0.8	0.9
Ceanothus	6	6	0.9	0.8	1.0
Scirpus	6	6	0.9	0.8	0.3

FLORA

This flora includes all vascular plants established as natural populations even though some have been introduced in very recent times. We have considered plants to be established as natural populations if they are reproducing without supplemental watering. Thus we exclude such things as lawn and garden weeds but include plants that are garden escapes. Occasionally, plants whose seeds are in wildflower seed packets or pasture seed mixes are found growing in natural habitats, but they are not included in the flora unless they are reproducing without supplemental water.

Our descriptions are very brief. Except for habit and flower color, the descriptions generally do not repeat characterisitcs that were used in the key. Additional characters are sometimes given where useful for identification. Characteristics used in the keys refer to groups as they occur in the Santa Monica Mountains.

The arrangement of the flora is alphabetical within the divisions. Species are alphabetical within genera; genera, within families; and families, within division. Divisions are arranged in the following order -- Lycophyta, Arthrophyta, Pterophyta, Coniferophyta, Anthophyta with the class Dicotyledoneae preceeding Monocotyledoneae.

An asterisk (*) before a species indicates that it is introduced, and the numbers following the range of the species in our area are the months in which spores or flowers are produced.

The metric system has been used for all measurements except elevation, which has been retained as feet because all the topographic maps for our area are in feet.

Abbreviations and symbols have been kept to a minimum. The following are those that have been used.

Miscellaneous

ca - about, around
cm - centimeters
dm - decimeters
E - east
ft - feet
m - meters
mm - millimeters
N - north
S - south
sn - without number
W - west
± - more or less, about

Herbaria

CAL - California Academy of Science
DAV - University of California, Davis
DS - Dudley
JEP - Jepson
LA - University of California, Los Angeles
POM - Pomona College
RSA - Rancho Santa Ana Botanic Garden
SFV - California State University, Northridge
UC - University of California, Berkeley

Key to the Divisions and Classes of Vascular Plants Represented in the Santa Monica Mountains

1a. Plants reproducing by spores produced in sporangia
  2a. Leaves (microphylls) about 2 mm long, with only a central, unbranched vein of vascular tissue; sporangia not on lower surface of leaves
    3a. Plants branched and spreading; stems erect, solid, not jointed, up to 10 cm tall; leaves (microphylls) spirally arranged; spores formed in sporangia borne on the upper surface and near the base of the leaf-like sporophylls, these developed toward the terminal portions of the branches LYCOPODOPHYTA
    3b. Plants erect; stems hollow, jointed, up to 2 m tall, conspicuously longitudinally grooved; leaves (microphylls) whorled, forming a short sheath at each node; sporangia borne in a terminal cone ARTHROPHYTA, p. 24
  2b. Plants bearing leaves (macrophylls) with numerous veins of vascular tissue or free floating aquatics (**Azolla**); sporangia borne on lower surface of the leaves PTEROPHYTA, p. 24
1b. Plants reproducing by seeds produced in cones or flowers
  4a. Trees or large shrubs; leaves needle- or scale-like; flowers absent, pollen formed in scale of a small cone, seeds borne on a scale in a woody cone or in a resinous 'berry' CONIFEROPHYTA, p. 27
  4b. Herbs, trees, or shrubs; leaves usually broad, rarely needle-like; flowers present, pollen borne in stamens, seeds enclosed in mature pistil ANTHOPHYTA
    5a. Leaves usually with net-veins; flowers 4- or 5-merous; cotyledons usually 2 Dicotyledonae, p. 28
    5b. Leaves with parallel veins; flowers usually 3-merous; cotyledons 1 Monocotyledonae, p. 138

LYCOPODOPHYTA

SELAGINELLACEAE

1. **Selaginella** Beauv. Spike-Moss

1. **S. bigelovii** Underw. (Fig. 13). Plants matted, moss-like, but branches ascending; leaves short, densely imbricated, awl-like; strobili terminal, scarcely distinguishable from vegetative parts of the plant. Common away from the coast throughout, often in shallow, clayey soil, on open, rocky or brushy slopes.

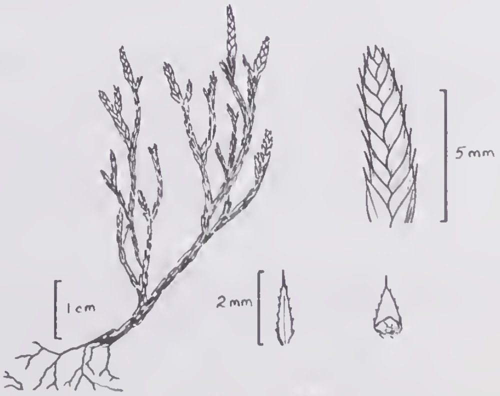


Figure 13. Selaginella bigelovii.

ARTHROPHYTA

EQUISETACEAE

1. **Equisetum** L. Horsetail, Scouring-Rush

1a. Aerial stems all green, with few irregular branches, bearing strobili
2a. Sheaths much longer than broad, ± funnel-shaped, green, normally with a narrow black band at the top 2. **E. laevigatum**
2b. Sheaths nearly or quite as broad as long, cylindrical usually ashy with 2 black bands 1. **E. hyemale**
1b. Aerial stems of two kinds, the fertile brownish, unbranched, the vegetative green, with a whorl of slender branches at each node, appearing later 3. **E. telmateia**

1. **E. hyemale** L. var. **affine** (Engelm.) A. A. Eat. Stems normally unbranched, 5-20 dm tall. Infrequent along streams and wet areas; Santa Ynez, Topanga and Tuna canyons. Occasionally hybridizes with **E. laevigatum** to form the sterile hybrid **E. X ferrisii** Clute.

2. **E. laevigatum** A. Br. [**E. funstonii** A. A. Eat.]. (Fig. 14). Smooth Scouring-Rush. Stems irregulary branched, up to 1 m tall, tufted; strobili obtuse. Scattered along streams at low elevations throughout. 4-7. Occasionaly hybridizes with **E. hyemale** to form the sterile hybrid **E. X ferrisii** Clute.

3. **E. telmateia** Ehrh. var. **braunii** (Milde) Milde. Giant Horsetail. Vegetative stems to 2 m tall, very rarely bearing strobili. Wet shaded places in canyons along the entire coast and east to Griffith Park. 2-4.

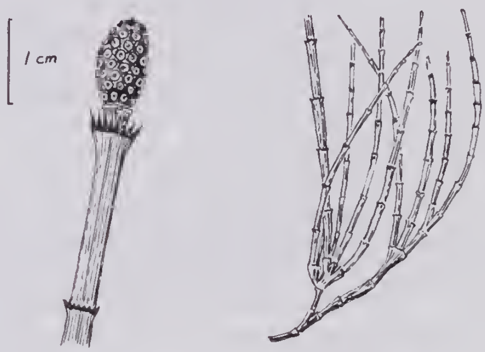


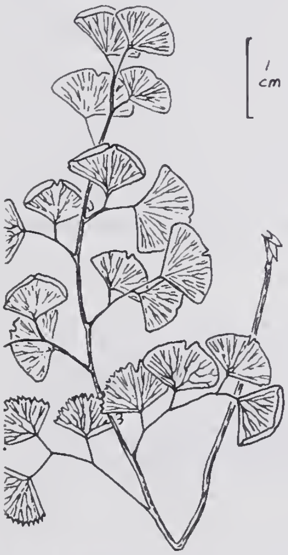
Figure 14. Equisetum laevigatum

PTEROPHYTA

1a. Plants up to 2.5 cm across, floating in masses on surface of water (Salviniales) 10. **Azolla**
1b. Plants not aquatic (Filicales)
2a. Fronds about 1 dm long, densely covered with loose gray pubescence 4. **Cheilanthes newberryi**
2b. Fronds not pubescent above
3a. Primary branches of frond undivided, margins serrate or crenate, the frond less than 5 dm long
4a. Primary division of frond 4-6 cm long, rachis straw colored; indusia lacking 13. **Polypodium**
4b. Primary branches of frond less than 1.5 cm long, rachis dark purplish brown, indusia present but obscured by the expanded sporangia 8. **Asplenium**
3b. Primary branches of frond deeply divided or cut to midrib; frond length various
5a. Fronds covered with conspicuous golden powder beneath
6a. Sporangia scattered along veins; leaf margins not rolled 6. **Pityogramma**
6b. Sporangia in a ± continuous line around margin of frond; leaf margins rolled under into a false indusium 4. **Notholaena californica**
5b. Fronds without golden powder
7a. Smallest leaf segments ca 1-1.5 cm across, mostly broader than long, with a distinct stalk 1-3 mm long; stipes black, wiry 1. **Adiantum**
7b. Leaves otherwise, ultimate segments subsessile

8a. Leaves leathery, ultimate divisions revolute, mostly 1-4 mm long, about 1-2 mm wide, prominenty mucronate — 5. **Pellaea mucronata**
8b. Ultimate leaf divisions larger or not prominently mucronate
  9a. Ultimate leaf divisions rarely more than 1 mm wide, the fronds broadly triangular, lacy; plants 1-3 dm tall
    10a. Indusia not continuous; fronds glabrous — 2. **Aspidotis**
    10b. Indusia continuous; fronds scaly — 3. **Cheilanthes**
  9b. Ultimate leaf divisions at least 2.5 mm wide
    11a. Sori elongate, in chains along midveins; indusium attached along its broad side; tall coarse fern of wet places — 11. **Woodwardia**
    11b. Sori not as above
      12a. Indusium reniform
        13a. Veins forked 2-several times; hairs absent on rachis — 7. **Dryopteris**
        13b. Veins simple or forked once; fine hairs on rachis — 9. **Thelypteris**
      12b. Indusium linear to elongate, formed by reflexed frond margin
        14a. Coarse ferns of shaded places, mostly 1-2 m tall; ultimate leaf divisions with broad sessile bases, often confluent — 12. **Pteridium**
        14b. Wiry ferns of rocky slopes, mostly about 3 dm tall; ultimate leaf divisions with short stalks — 5. **Pellaea andromedifolia**

Figure 15.



Adiantum jordanii.

ADIANTACEAE

1. **Adiantum** L. Maidenhair Fern

1a. Indusia interrupted, ca 2 mm long; leaf-segments wedge-shaped or subrhomboidal with a deeply lobed margin and irregular outline — 1. **A. capillus-veneris**
1b. Indusia nearly continuous, up to 8 mm long; leaf-segments fan-shaped, semicircular or roundish, with a scarcely lobed margin — 2. **A. jordanii**

1. **A. capillus-veneris** L. Venus-hair Fern. Similar in habit to No. 2. Scattered in wet places, along seepages, at low elevations throughout.

2. **A. jordanii** C. Muell. California Maidenhair Fern. (Fig. 15). Fronds 2-5 dm tall, revolute at margins; sori marginal. Occasional on shaded slopes under shrubs or in southern oak woodland below 2000 ft elevation and away from the immediate coast. 3-5.

2. **Aspidotis** (Nutt. ex Hook.) Copel.

1. **A. californica** Nutt. [**Cheilanthes californica** (Nutt.) Mett.]. California Lace Fern. Plants clumped, bright green, stipe wiry, dark; fronds very finely divided. Rare in rock crevices on protected slopes away from the coast; Topanga Canyon eastward. 3-4.

3. **Cheilanthes** Sw. Lip Fern

1a. Fronds scaly	1. **C. covillei**
1b. Fronds tomentose	2. **C. newberryi**

1. **C. covillei** Maxon. Rhizome short, creeping; fronds scaly; segments bead-like. Rocky crevices, Boney Ridge, **Koutnik et al. 600** (DAV).

2. **C. newberryi** D. C. Eaton. [**Notholaena newberryi** (D. C. Eaton) Domin.]. Cotton Fern. Fronds oblong ca 1 dm tall; stipe wiry, purplish. Rare, rock crevices; vicinity of Conejo Mountain. 3-5.

4. **Notholaena** R. Br.

1. **N. californica** D. C. Eaton. Cloak Fern. Fronds broadly deltoid-pentagonal, ca 1 dm tall; stipe brown or yellowish. Rare, on rocky slopes under brush; Point Mugu, Malibu Canyon.

5. **Pellaea** Link. Cliff-Brake

1a. Leaf-segments obtuse; rhizomes about 3 mm thick	1. **P. andromedifolia**
1b. Leaf-segments mucronate; rhizomes about 1 cm thick	2. **P. mucronata**

1. **P. andromedifolia** (Kaulf.) Fee var. **andromedifolia.** Coffee Fern. Fronds 1.5-4 dm tall, loosely clumped; leaf-segments revolute, oblong, ca 10 mm long, ca 3 mm wide; sori marginal. Common throughout on brushy slopes and in shallow soil away from the immediate coast. 1-4. The slightly pubescent var. **pubescens** Baker has been collected at Point Mugu.

2. **P. mucronata** (D. C. Eaton) D. C. Eaton var. **mucronata.** Bird's Foot Fern. Fronds 1-4 dm tall, in dense clumps; leaf-segments revolute, linear oblong to elliptic, 2-6 mm long; sori marginal. Frequent throughout on brushy slopes and in shallow soil away from the immediate coast. 12-6.

6. **Pityrogramma** Link.

1. **P. triangularis** (Kaulf.) Maxon var. **triangularis.** Goldback Fern. Plants about 1-4 dm tall; fronds not much longer than broad; mature stipe black, wiry. Common throughout on slopes under brush or in rock crevices. 12-4.

ASPIDIACEAE

7. **Dryopteris** Adans. Woodfern

1. **D. arguta** (Kaulf.) Watt. Coastal Woodfern. Rhizome stout, brown scaly; fronds oblong, 2.5-6 dm long, with relatively short densely scaly stipes. Forming clumps on wooded slopes or occasionally under brush away from the immediate coast throughout. 4-11.

ASPLENIACEAE

8. **Asplenium** L. Spleenwort

1. **A. vespertinum** Maxon. Fronds ca 0.5-1.5 cm long. Rare, moist silty soil; Lake Sherwood.

9. **Thelypteris** Schmidel.

1. **T. puberula** (Baker) Morton. [**Lastrea augescens** (Link.) J. Sm.]. Stipes straw-colored; fronds oblong, 3-10 dm long, with primary divisions not divided to the midrib. Rare, in clumps along streams; Encinal Canyon.

AZOLLACEAE Water Fern Family

10. **Azolla** Lam. Mosquito Fern, Duck Fern

1. **A. filiculoides** Lam. Moss-like floating plants, often reddish, the surface wrinkled. Locally

abundant on the surface of still water or rarely adjacent damp soil; drainage of Malibu Creek, Lake Sherwood.

BLECHNACEAE

11. **Woodwardia** Sm. Chain Fern

1. **W. fimbriata** Sm. Rhizome stout, erect to short creeping, scaly; stipes short, yellowish-brown; fronds almost erect, in a circle, 1-2 m tall, 2-5 dm wide; segments acuminate. Local along streams in partial shade, up to 2700 ft; Cold Creek, Malibu Creek, and westward. 5-8.

DENNSTAEDTIACEAE

12. **Pteridium** Scop. Bracken Fern

1. **P. aquilinum** (L.) Kuhn var. **pubescens** Underw. [**P. a.** var. **lannuginosum** (Bong.) Fern.]. Western Bracken. Tall fern with large deltoid fronds from a stout spreading rhizome. Forming colonies locally in deeply shaded canyons at low elevations fairly near the coast from Temescal Canyon westward. 9-11.

POLYPODIACEAE

13. **Polypodium** L. Polypody

1. **P. californicum** Kaulf. Fronds mostly 1.5-4 dm tall; stipes straw-colored; leaf segments acuminate. Common throughout on protected, often rocky slopes, usually where water runs in winter. 1-5.

CONIFEROPHYTA

With the probable exception of **Juniperus** mentioned below, there is no site in the Santa Monica Mountains where conifers are reproducing to an extent that they can be considered as natural populations. Various species of **Cupressus** and **Pinus** have been planted throughout the mountains, usually along roads and trails or clustered about places of habitation. On one slope east of Saddle Peak many individuals of **Cupressus forbesii** are established in the chaparral. These trees have grown from seed scattered after a fire in the early 1930's.

CUPRESSACEAE

1. **Juniperus** L. Juniper

1. **J. californica** Carr. Small, aromatic tree or arborescent shrub; leaves scalelike, closely appressed; cones fleshy, berrylike, bluish at first with dense bloom becoming reddish-brown beneath bloom. Rare; only two mature trees are known to occur in the hills south of Cornell Corners, near Agoura, where they are associated with other plants more common to the interior. The Kanan fire of 1978 killed a small population of 20 to 30 younger plants that were growing in this area.

ANTHOPHYTA

Dicotyledonae

Key to the Families of Dicotyledonae Represented in the Santa Monica Mountains

1a. Perianth absent or essentially so	Group 1
1b. Perianth present, although sometimes fugaceous	
2a. Perianth consisting of one series	
3a. Perianth parts free or essentially so	
4a. Perianth sepaloid or inconspicuous, not petaloid	Group 2, p. 29
4b. Perianth petaloid	Group 3, p. 29
3b. Perianth parts united	Group 4, p. 30
2b. Perianth consisting of two or more series	
5a. Perianth not clearly differentiated into distinct whorls of calyx and corolla	Group 5, p. 31
5b. Perianth differentiated into distinct whorls of calyx and corolla	
6a. Some or all petals united	Group 6, p. 31
6b. All petals free	Group 7, p. 33

* * * * *

Group 1. Perianth absent

1a. Plants with milky juice; flowers in a cyathium; ovary 3-celled on a conspicuous gynophore	Euphorbiaceae
1b. Plants without milky juice; flowers variously arranged, not in a cyathium	
2a. Leaves opposite, verticillate, or basal	
3a. Shrubs with leathery leaves	Garryaceae
3b. Herbs or succulent sprawling subshrubs	
4a. Flowers in many-flowered spikes; leaves subterete; plants maritime	Bataceae
4b. Flowers one to three in leaf axils; leaves flat; plants of nonmaritime moist places	Callitrichaceae
2b. Leaves alternate	
5a. Leaves pinnately compound	Juglandaceae
5b. Leaves pinnately or palmately simple	
6a. Herbs or succulent suffrutescent perennials; flowers in erect spikes subtended by conspicuous white bracts	Saururaceae
6b. Trees or shrubs; flowers variously arranged, not subtended by conspicuous white bracts	
7a. Leaves palmately veined, petioles enclosing the buds	Platanaceae
7b. Leaves pinnately veined, petioles not enclosing the buds	
8a. Leaves glandular-punctate, usually aromatic; fruit a woody capsule or drupe	
9a. Flowers unisexual; ovary superior; stamens 16 or fewer; fruit a small, blue, waxy drupe	Myricaceae
9b. Flowers hermaphroditic; ovary inferior; stamens numerous; fruit a woody capsule	Myrtaceae
8b. Leaves not glandular-punctate, not aromatic; fruit a nut, capsule, or utricle	
10a. Plants with a scurfy, mealy or stellate pubescence	Chenopodiaceae
10b. Plants glabrous or with simple or glandular pubescence	
11a. Plants dioecious; flowers in catkins; fruit a capsule; seeds covered with fine hairs	Salicaceae
11b. Plants monoecious; staminate flowers in catkins; pistillate flowers geminate or in cone-like spikes	Betulaceae

* * * * *

Group 2. Perianth parts free, in one series, sepaloid or inconspicuous

1a. Trees, shrubs, or woody vines	
2a. Tendril-bearing vines; perianth calyptrate	Vitaceae
2b. Not tendril-bearing vines; perianth not calyptrate	
3a. Flowers hermaphroditic	
4a. Perianth 6-merous; fruit a triangular achene	Polygonaceae
4b. Perianth 3- to 5-merous; fruit a utricle	Chenopodiaceae
3b. Flowers unisexual, monoecious, dioecious or polygamous	
5a. Staminate flowers in catkins	
6a. Leaves opposite; plants dioecious	Garryaceae
6b. Leaves alternate; plants monoecious	Betulaceae
5b. Staminate flowers not in catkins	
7a. Plants with a mealy or scurfy pubescence	Chenopodiaceae
7b. Plants not with a mealy or scurfy pubescence	Euphorbiaceae
1b. Herbs	
8a. Flowers unisexual, monoecious, dioecious, or polygamous	
9a. Leaves deeply lobed, divided or compund	
10a. Leaves ternately decompound, leaflets short oblong to orbicular	Ranunculaceae (**Thalictrum**)
10b. Leaves pinnately lobed to divided	Chenopodiaceae
9b. Leaves entire to serrate or sinuate, sometimes scale-like	
11a. Plants densely stellate-pubescent	Euphorbiaceae
11b. Plants glabrous, with simple or glandular pubescence, or scurfy	
12a. Leaves basal, flowering stems leafless or bracteate, or if leaves cauline then with scarious stipules	Polygonaceae
12b. Leaves cauline, the stipules absent or not scarious	
13a. Sepals and floral bracts dry and scarious	Amaranthaceae
13b. Sepals and floral bracts not dry and scarious	
14a. Stigma 1	Urticaceae
14b. Stigmas 2-5	Chenopodiaceae
8b. Flowers hermaphroditic	
15a. Ovary 1-ovuled; fruit an achene, utricle, or drupe	
16a. Leaves pinnately simple to lobed or reduced	
17a. Leaves opposite	
18a. Stipules present, scarious	Caryophyllaceae
18b. Stipules absent	Amaranthaceae
17b. Leaves alternate	
19a. Fruit a triangular achene	Polygonaceae
19b. Fruit not a triangular achene	
20a. Leaves basal, flowering stems leafless or bracteate, or if leaves cauline then with scarious stipules	Polygonaceae
20b. Leaves cauline, exstipulate	
21a. Sepals and floral bracts dry and scarious	Amaranthaceae
21b. Sepals and floral bracts not dry and scarious	Chenopodiaceae
16b. Leaves pinnately or palmately compound or palmately deeply lobed	Rosaceae
15b. Ovary 2- to many-ovuled; fruit not as above	
22a. Stamens 6 or fewer; leaves verticillate	Rubiaceae (**Galium**)
22b. Stamens 7 or more; leaves not verticillate	Aizoaceae

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Group 3. Perianth parts free, in one series, petaloid

1a. Flowers unisexual, monoecious, dioecious, or polygamous	Ranunculaceae (**Clematis**)
1b. Flowers hermaphroditic	

2a. Leaves variously compound or dissected	
3a. Stamens the same number as the perianth parts	Apiaceae
3b. Stamens numerous, more than twice the number of perianth parts	
4a. Carpels free; fruit a group of achenes or follicles	Ranunculaceae
4b. Carpels united; fruit a capsule; perianth falsely in one-series due to caducous sepals	Papaveraceae
2b. Leaves simple, entire to dentate	
5a. Ovary inferior	
6a. Leaves verticillate	Rubiaceae **(Galium)**
6b. Leaves opposite	Cornaceae
5b. Ovary superior	
7a. Fruit a 3-angled achene; flowers in involucrate clusters	Polygonaceae
7b. Fruit a large drupe; flowers not in involucrate clusters	Lauraceae

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Group 4. Perianth parts united, consisting of one series

1a. Perianth parts fused to form a calyptra falling at anthesis	
2a. Tendril-bearing vines	Vitaceae
2b. Trees or shrubs, glandular-punctate, usually aromatic	Myrtaceae
1b. Perianth parts not forming a calyptra	
3a. Perianth sepaloid	
4a. Plants stem-parasites	Viscaceae
4b. Plants not parasitic	
5a. Tall herbs of moist places with pinnately incised leaves	Datiscaceae
5b. Trees or shrubs; leaves various	
6a. Leaves compound; stamens 2	Oleaceae **(Fraxinus)**
6b. Leaves simple; stamens more than 2	
7a. Flowers unisexual, the staminate ones in catkins; fruit an acorn	Fagaceae
7b. Flowers unisexual or hermaphroditic, not in catkins; fruit a berry or an achene	
8a. Stamens 4-5; fruit a berry	Rhamnaceae
8b. Stamens many; fruit an achene	Rosaceae **(Cercocarpus)**
3b. Perianth petaloid	
9a. Stamens united by their anthers; flowers on a broadened receptacle in involucrate heads	Asteraceae
9b. Stamens not united by their anthers; flowers not in heads on a broadened receptacle	
10a. Ovary superior	
11a. Calyx rose purplish; ovary 1-celled, the ovule solitary	Nyctaginaceae
11b. Calyx yellowish or greenish; ovary 2-4 celled	Rhamnaceae
10b. Ovary inferior or apparently so	
12a. Ovary appearing inferior by the constriction of the perianth tube above the ovary	Nyctaginaceae
12b. Ovary truly inferior	
13a. Leaves opposite or verticillate	
14a. Perianth 4-merous; stamens 4; leaves verticillate	Rubiaceae **(Galium)**
14b. Perianth 5-merous; stamens 1 or 3; leaves opposite	Valerianaceae
13a. Leaves alternate; tendril climbing vines	Cucurbitaceae

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Group 5. Perianth consisting of two or more series, poorly differentiated into calyx and corolla

1a. Ovary inferior; plants fleshy; leaves usually scale-like	Cactaceae
1b. Ovary superior; plants not fleshy; leaves not scale-like	
2a. Styles 2 or 3; carpels united; fruit a 3-sided or lenticular achene	Polygonaceae
2b. Style simple; carpels one to many, free; fruit not a 3-sided achene	
3a. Shrubs or trees; fruit a berry; anthers usually opening by hinged valves	
4a. Stamens in 3 whorls of 3 each; aromatic trees	Lauraceae
4b. Stamens in 1 whorl of 6; shrubs, not aromatic	Berberidaceae
3b. Herbs; fruit not an achene or follicle; anthers not opening by hinged valves	Ranunculaceae

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Group 6. Perianth differentiated into calyx and corolla; some or all petals united

1a. Some of petals united, others free	
2a. Flowers pea-like, petals 3 or 5; leaves cauline	
3a. Leaves compound, rarely simple; fruit a legume	Fabaceae
3b. Leaves simple, entire; fruit usually a capsule or samara, not a legume	Polygalaceae
2b. Flowers not pea-like; leaves mostly basal, compound or finely dissected; petals 4, the 2 inner united at the tip	Papaveraceae **(Dicentra)**
1b. All petals united to form a tube	
4a. Flowers several, borne on a broadened involucrate receptacle; stamens usually united by their anthers	Asteraceae
4b. Flowers not borne on a broadened involucrate receptacle, or if so the stamens not united by their anthers	
5a. Flowers unisexual; tendril bearing vines	Cucurbitaceae
5b. Flowers hermaphroditic	
6a. Fertile stamens 4 or fewer	
7a. Plants lacking chlorophyll, root parasites	Scrophulariaceae **(Orobanche)**
7b. Plants with chlorophyll	
8a. Flowers actinomorphic or nearly so	
9a. Carpels free, the same number as the petals	Crassulaceae
9b. Carpels united	
10a. Ovary inferior	
11a. Ovary 2-celled; stipules present	Rubiaceae
11b. Ovary 4-celled; stipules absent	Caprifoliaceae **(Symphoricarpos)**
10b. Ovary superior	
12a. Stamens 4, equal in number to corolla lobes and opposite them	Primulaceae
12b. Stamens 4 or less, alternate with corolla lobes	
13a. Stamens 2	
14a. Shrub with pinnately compound leaves	Oleaceae
14b. Herbs with simple leaves	Scrophulariaceae **(Veronica)**
13b. Stamens 4	
15a. Leaves alternate	Solanaceae
15b. Leaves opposite, verticillate, or basal	
16a. Flowers scarious and dry, leaves in basal rosettes; inflorescence scapose	Plantaginaceae

16b. Flowers not scarious and dry; herbaceous perennials with cauline leaves	Verbenaceae
8b. Flowers zygomorphic or irregular	
17a. Ovary inferior; fruit an achene	Valerianaceae
17b. Ovary superior or nearly so; fruit a capsule, berry, or drupe	
18a. Ovary deeply 4-lobed; style gynobasic; fruit of 4 nutlets	
19a. Flowers zygomorphic, usually strongly bilabiate	Lamiaceae
19b. Flowers weakly zygomorphic	Verbenaceae **(Verbena)**
18b. Ovary not deeply 4-lobed; style not gynobasic; fruit a capsule	Scrophulariaceae
6b. Fertile stamens 5 or more	
20a. Fertile stamens more than the number of petals	
21a. Stamens 8; petals 5	Polygalaceae
21b. Stamens twice or more than twice the number of petals	
22a. Stamens twice the number of petals	
23a. Carpels free, the same number as the corolla lobes	Crassulaceae
23b. Carpels united, two or more	
24a. Leaves compound; herbs	Oxalidaceae
24b. Leaves simple; shrubs	Ericaceae
22b. Stamens more than twice the number of petals	
25a. Carpel one; fruit a follicle	Rununculaceae **(Delphinium)**
25b. Carpels two or more, united; fruit a capsule	Polygalaceae
20b. Stamens equalling or fewer than the number of petals	
26a. Filaments united to form a conspicuous tube or anthers variously united	
27a. Flowers actinomorphic, not blue; anthers united with stigma; fruit of two follicles	Asclepiadaceae
27b. Flowers zygomorphic, blue; anthers free from stigma; fruit a capsule	Campanulaceae
26b. Filaments free or connivent, sometimes epipetalous or connate at the base; anthers free or connivent	
28a. Herbs without chlorophyll, parasitic; leaves reduced to bracts	
29a. Style 1; fruit of many 1-seeded nutlets; flowers in dense terminal spikes or heads	Lennoaceae
29b. Styles 2; fruit a 1- to 4-seeded capsule; flowers borne laterally	Convolvulaceae **(Cuscuta)**
28b. Plants green, not parasitic; leafy	
30a. Ovary inferior	
31a. Leaves opposite or verticillate	
32a. Herbs with verticillate leaves	Rubiaceae
32b. Shrubs or subshrubs with opposite leaves	Caprifoliaceae
31b. Leaves alternate	Campanulaceae
30b. Ovary superior	
33a. Ovary of 1 or more free carpels	
34a. Carpel 1; fruit an achene enclosed by the calyx; flowers in a calyx-like involucre	Nyctaginaceae **(Mirabilis)**
34b. Carpels 2 or more; fruit not an achene; flowers not involucrate	
35a. Carpels 2, connate at least at the base; anthers usually connivent over the stigma	Apocynaceae
35b. Carpels the same number as the petals, never 2, free; anthers not connivent	Crassulaceae
33b. Ovary of 2 or more united carpels	
36a. Ovary 3-celled, styles or style branches 3	Polemoniaceae

36b. Ovary 1- to 2-celled, or rarely 3-, 5- or more-celled; styles 1 or 2, 4 or 5, stigma entire, 2- or 4-lobed
37a. Leaves all or mostly opposite
38a. Trees, shrubs, or woody vines
39a. Stamens connivent around style; leaves exstipulate Apocynaceae
39b. Stamens free from style; leaves stipulate Buddlejaceae
38b. Herbs
40a. Leaves entire; style simple; stigma entire or 2-lobed
41a. Stamens opposite corolla lobes Primulaceae
41b. Stamens alternate with corolla lobes
42a. Viscid herbs; lower leaves alternate Solanaceae (**Petunia**)
42b. Plants not viscid; leaves all opposite Gentianaceae
40b. Leaves crenate to lobed or compound; styles 2, free or connate below Hydrophyllaceae
37b. Leaves alternate or basal
43a. Styles 2 or more, free or connate at base
44a. Styles 5; stamens opposite corolla lobes Plumbaginaceae
44b. Styles 2 or 4; stamens alternate with corolla lobes
45a. Flowers solitary; stigmas capitate Convolvulaceae
45b. Flowers usually not solitary; stigmas not capitate Hydrophyllaceae
43b. Styles 1; stigma entire or lobed
46a. Stamens opposite petals or fewer than the number of petals and opposite the inner whorl of petals Primulaceae
46b. Stamens alternate with petals
47a. Ovules 2 or fewer per cell
48a. Fruit of 1-4 nutlets; style usually gynobasic Boraginaceae
48b. Fruit a capsule or drupe; style not gynobasic
49a. Twining vines Convolvulaceae
49b. Plants not twining
50a. Corolla plicate; style simple, stigmas 2, oblong or linear Convolvulaceae
50b. Corolla not plicate; style bifid, stigmas terminal or capitate Hydrophyllaceae
47b. Ovules several to many per cell
51a. Styles bifid; flowers often in scorpioid cymes Hydrophyllaceae
51b. Styles simple; flowers not in scorpioid cymes Solanaceae

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Group 7. Perianth differentiated into calyx and corolla; petals free

1a. Flowers unisexual, monoecious, dioecious, or polygamous
2a. Leaves opposite
3a. Leaves fleshy, sessile, venation obscure Bataceae
3b. Leaves not fleshy, usually petiolate, the venation evident
4a. Vines; leaves pinnately compound or upper leaves entire Ranunculaceae (**Clematis**)
4b. Trees; leaves palmately lobed, trifoliate, or palmately compound Aceraceae
2b. Leaves alternate, basal, or reduced and inconspicuous
5a. Vines with tendrils Vitaceae
5b. Plants not vines
6a. Herbs Polygonaceae (**Rumex**)
6b. Trees or shrubs
7a. Leaves pinnately compound
8a. Fruit a samara; flowers polygamodioecious; leaves 3-6 dm long, leaflets lanceolate to oblong Simaroubaceae

8b. Fruit a red drupe; flowers hermaphroditic; leaves 2-3 dm long, leaflets lance-linear	Anacardiaceae
7b. Leaves simple or trifoliate	Anacardiaceae
1b. Flowers hermaphroditic	
9a. Stamens more than twice the number of petals or stamens and petals numerous	
10a. Carpels one to many, free	
11a. Carpel solitary	
12a. Herbs	Ranunculaceae
12b. Trees or shrubs	
13a. Fruit an achene or drupe; petals 5	Rosaceae
13b. Fruit a legume; petal 1	Fabaceae **(Amorpha)**
11b. Carpels 2 or more	
14a. Hypanthium present, salverform	Rosaceae
14b. Hypanthium absent	
15a. Carpels united at anthesis, free at maturity; sepals 3; petals 6	Papaveraceae **(Platystemon)**
15b. Carpels free at anthesis; sepals and petals various	
16a. Flowers dull purplish brown; disk present, fleshy; seeds arillate	Paeoniaceae
16b. Flowers not dull purplish brown; disk absent; seeds not arillate	Ranunculaceae
10b. Carpels several, united	
17a. Aquatic herbs	Nymphaeaceae
17b. Terrestrial herbs, shrubs, or trees	
18a. Ovary inferior	
19a. Petals numerous	Aizoaceae
19b. Petals fewer than 10	
20a. Ovary 1-celled; fruit a capsule; herbs	Loasaceae
20b. Ovary 2- to 6-celled; fruit a pome; shrubs or small trees	Rosaceae
18b. Ovary superior	
21a. Hypanthium conspicuous	Lythraceae
21b. Hypanthium absent or inconspicuous	
22a. Ovule 1; fruit a nutlet	Polygonaceae
22b. Ovules 2 to many; fruit not a nutlet	
23a. Sepals less than the number of petals	
24a. Petals 4 or 6, twice the number of sepals	Papaveraceae
24b. Petals 5 or more, not twice the number of sepals	
25a. Sepals 3; subshrubs	Cistaceae
25b. Sepals not 3; succulent herbs	Portulacaceae
23b. Sepals the same number as the petals or more	
26a. Leaves opposite	Cistaceae
26b. Leaves alternate	Malvaceae
9b. Stamens twice the number of petals or fewer	
27a. Stamens twice the number of petals	
28a. Leaves alternate or basal	
29a. Ovary inferior	
30a. Leaves basal or palmately simple	Saxifragaceae
30b. Leaves cauline, pinnately simple	Onagraceae
29b. Ovary superior	
31a. Annual or perennial herbs	
32a. Leaves compound or dissected	
33a. Leaves aromatic, conspicuously gland dotted	Rutaceae
33b. Leaves not aromatic or gland dotted	
34a. Carpels 1 to many, free	
35a. Ovule solitary; fruit an achene	Rosaceae

35b. Ovules numerous; fruit a capsule	Saxifragaceae
34b. Carpels 2-5, at least ovaries or styles united	
36a. Ovules solitary; fruit a schizocarp or nutlet	Geraniaceae
36b. Ovules numerous; fruit a capsule	
37a. Ovary 5-celled; styles 5, free	Oxalidaceae
37b. Ovary 1- to 2-celled; styles or style branches 2-4	Saxifragaceae
32b. Leaves simple	
38a. Ovary open at top exposing ovules at anthesis	Resedaceae
38b. Ovary closed at anthesis	
39a. Carpels free at anthesis	
40a. Carpels the same number as the petals	Crassulaceae
40b. Carpels fewer than the petals	Saxifragaceae
39b. Carpels united	
41a. Ovule 1 per cell	
42a. Fruit a 1-celled, 1-seeded nutlet	Polygonaceae
42b. Fruit a 5-celled schizocarp	Geraniaceae
41b. Ovules several to many per cell	
43a. Hypanthium tubular, conspicuously ribbed	Lythraceae **(Lythrum)**
43b. Hypanthium absent, or short and not ribbed	
44a. Sepals the same number as the petals	Saxifragaceae
44b. Sepals 2, petals usually 5	Portulacaceae **(Calandrinia)**
31b. Trees or shrubs	
45a. Leaves compound	Anacardiaceae
45b. Leaves simple	
46a. Ovule 1 per cell	
47a. Leaves linear-filiform; hypanthium present; fruit an achene	Rosaceae **(Adenostoma)**
47b. Leaves not linear-filiform; hypanthium absent; fruit a drupe	Anacardiaceae
46b. Ovules 2 to many per cell	Rosaceae
28b. Leaves opposite	
48a. Ovary inferior	Onagraceae
48b. Ovary superior	
49a. Herbs	
50a. Styles adnate to a central column; leaves usually palmately veined	Geraniaceae
50b. Styles not adnate to a column; leaves pinnately simple or compound	
51a. Leaves compound; fruit a schizocarp	Zygophyllaceae
51b. Leaves simple; fruit a capsule	
52a. Hypanthium conspicuous, frequently petaloid, ridged	Lythraceae
52b. Hypanthium absent	
53a. Petals twice the number of sepals	Papaveraceae **(Meconella)**
53b. Petals equalling the number of sepals	Caryophyllaceae
49b. Trees; leaves palmately lobed	Aceraceae
27b. Stamens fewer than twice the number of petals	
54a. Stamens equalling the number of petals	
55a. Herbs	
56a. Leaves alternate or basal	
57a. Ovary inferior	
58a. Inflorescence umbellate	Apiaceae
58b. Inflorescence not umbellate	Saxifragaceae
57b. Ovary superior	

59a. Carpels free or essentially so	
60a. Leaves pinnately compound; fruit an achene	Rosaceae
60b. Leaves simple or palmately compound above; fruit a capsule	
61a. Carpels the same number as the petals	Crassulaceae
61b. Carpels fewer than the petals	Saxifragaceae
59b. Carpels united	
62a. Stamens opposite the petals	
63a. Sepals 2	Portulacaceae **(Claytonia)**
63b. Sepals 3-6	
64a. Ovule solitary; styles 2-5	
65a. Styles 5, free	Plumbaginaceae
65b. Styles 2-3, usually free	Polygonaceae
64b. Ovules numerous; style 1	Primulaceae
62b. Stamens alternate with the petals	
66a. Sepals 2; petals 3-10	Portulacaceae
66b. Sepals the same number as the petals	
67a. Hypanthium conspicuous	Lythraceae
67b. Hypanthium absent	
68a. Flowers spurred, strongly zygomorphic	Violaceae
68b. Flowers not spurred, actinomorphic or weakly zygomorphic	
69a. Ovary 1-celled, 1-ovuled; fruit an achene	Polygonaceae
69b. Ovary not 1-celled, 1-ovuled; fruit a capsule or schizocarp	
70a. Leaves palmately veined	Saxifragaceae
70b. Leaves pinnately veined	
71a. Petals 4; fruit a silique	Brassicaceae
71b. Petals 5; fruit a capsule	Linaceae
56b. Leaves opposite	
72a. Carpels free, the same number as the petals	Crassulaceae
72b. Carpels united	
73a. Ovary 1-celled, 1-ovuled, fruit an achene	Polygonaceae
73b. Ovary 1- to several-celled, the ovules more than 1 per cell; fruit a capsule	
74a. Stamens opposite the petals	Primulaceae
74b. Stamens alternate with the petals	
75a. Hypanthium conspicuous	Lythraceae
75b. Hypanthium absent	
76a. Sepals the same number as the petals	
77a. Ovary 1-celled	
78a. Calyx tubular; ovules on a parietal placentae	Frankeniaceae
78b. Calyx of distinct sepals; ovules on a free central placenta	Caryophyllaceae
77b. Ovary 2- to 5-celled	
79a. Ovary 2- to 4-celled	Elatinaceae
79b. Ovary 5-celled	Geraniaceae **(Erodium)**
76b. Sepals not the same number as the petals	
80a. Sepals 2, petals 3, 5 or more, never twice the number as the petals	Portulacaceae
80b. Sepals 2 or 3, petals twice the number of the sepals	Papaveraceae **(Meconella)**
55b. Trees, shrubs, or woody vines	
81a. Stamens opposite the petals	

82a. Tendril-bearing vines	Vitaceae
82b. Plants not vines	
83a. Leaves pinnately compound	Berberidaceae
83b. Leaves simple	Rhamnaceae
81b. Stamens alternate with the petals	
84a. Ovary inferior or essentially so	
85a. Hypanthium present; leaves palmately veined	Saxifragaceae
85b. Hypanthium absent; leaves pinnately veined	Cornaceae
84b. Ovary superior	
86a. Leaves opposite	Aceraceae
86b. Leaves alternate	
87a. Leaves scale-like	Tamaricaceae
87b. Leaves not scale-like	Anacardiaceae
54b. Stamens not equalling the number of petals	
88a. Leaves peltate	Tropaeolaceae
88b. Leaves not peltate	
89a. Fertile stamens fewer than the number of petals	
90a. Sepals 2, petals 3 or more	Portulacaceae
90b. Sepals 3 or more, the same number as the petals	
91a. Leaves alternate or basal; fruit an achene	Polygonaceae
91b. Leaves opposite; fruit a capsule	Caryophyllaceae
89b. Fertile stamens more than the number of petals	
92a. Leaves opposite	
93a. Hypanthium conspicuous, ribbed and corolloid	Lythraceae
93b. Hypanthium absent or inconspicuous	
94a. Herbs	
95a. Sepals 3 (rarely 2); not in salt marshes	Papaveraceae **(Meconella)**
95b. Sepals 4-6; salt marsh plants	Frankeniaceae
94b. Trees	Aceraceae
92b. Leaves alternate or basal	
96a. Leaves compound	
97a. Outer petals spurred or gibbous, the two inner united over stigma	Papaveraceae **(Dicentra)**
97b. Petals not spurred, not united over stigma	
98a. Gynophore conspicuous	
99a. Ovary 1-celled	Capparaceae
99b. Ovary 2-celled with a membranous septum	Brassicaceae
98b. Gynophore absent	Brassicaceae
96b. Leaves simple	
100a. Flowers pea-like, strongly zygomorphic	Polygalaceae
100b. Flowers not pea-like, actinomorphic or weakly zygomorphic	
101a. Sepals fewer than the petals	
102a. Sepals 2, petals 3 or more	Portulacaceae
102b. Sepals 3, petals 6	Papaveraceae
101b. Sepals the same number or more numerous than the petals	
103a. Sepals the same number as the petals	
104a. Petals 4; fruit a silique or silicle	Brassicaceae
104b. Petals 2 or 3; fruit an achene	Polygonaceae
103b. Sepals 4, the petals 2	Resedaceae

ACERACEAE

1. **Acer** Maple

1a. Leaves simple, palmately lobed, round in outline, 1-2 dm in diameter; body of samara with long stiff hairs **1. A. macrophyllum**
1b. Leaves pinnately compound; leaflets 3-5, ovate; body of samara short pubescent **2. A. negundo**

1. **A. macrophyllum** Pursh. Bigleaf Maple, Canyon Maple. Tree 10-20 m tall. Locally abundant along streams and in steep side canyons; riparian woodland; upper Rustic Canyon to upper Sycamore Canyon; above Cornell Corners. 3-5.

2. ***A. negundo** L. subsp. **californicum** (T. & G.) Wesmael. Box-Elder. Tree, ca 10 m tall. Confluence of Cold and Malibu Creeks; riparian woodland; Topanga Canyon, **Lloyd**, in 1933 (LA); probably introduced. 4-5.

AIZOACEAE Carpet Weed Family

1a. Petals none **5. Tetragonia**
1b. Petals many
2a. Plants annual; leaves mostly alternate, covered with shining vesicles **4. Mesembryanthemum**
2b. Plants perennial; leaves opposite, smooth
3a. Leaf blades flat, ovate; placentation axile **1. Aptenia**
3b. Leaf blades 3-sided or terete, linear; placentation parietal
4a. Leaves bluntly trigonous in cross-secton, glaucous blue-green; flowers orange and/or purple **3. Malephora**
4b. Leaves sharply trigonous in cross-section, green to glaucous green; flowers magenta or yellow **2. Carpobrotus**

1. **Aptenia** N. E. Br.

1. ***A. cordifolia** (L. f.) N. E. Br. [**Mesembryanthemum cordifolium** L. f.]. Suffrutescent, prostrate perennial, stems often 6 dm long; leaves to 3 cm long, petioled; petals rose-purple, about 5 mm long; capsules to 2 cm long. Along the coast; mouth of Topanga Canyon; Santa Monica. 3-10. Native of South Africa.

2. **Carpobrotus** N. E. Br.

1a. Leaves straight, not serrate, 3-5 cm long **1. C. aequilaterus**
1b. Leaves curved, the older ones serrate on lower angle, at least near the tips, becoming 7-10 cm long **2. C. edulis**

1. ***C. aequilaterus** (Haw.) N. E. Br. [**Mesembryanthemum chilense** Mol.]. Sea-Fig. Prostrate, succulent perennial; stems 1 m or more in length, forming extensive mats; flowers terminal, sessile or short-peduncled, 3.5 cm broad; petals magenta. Occasional throughout but more common along coast; coastal sage scrub, coastal strand. 4-9. Probably native to Australia. Hybridizes with **C. edulis**.

2. ***C. edulis** (L.) N. E. Br. [**Mesembryanthemum edule** L.]. Hottentot-Fig. Similar to **C. aequilateralis**; flowers 8-10 cm broad; petals yellow, sometimes magenta, usually drying pink; fruit fleshy; seeds smooth. Throughout the area, often planted along highways. 4-10. Native of South Africa but naturalized in temperate region throughout the world. Hybrizes with **C. aequilaterus**.

3. **Malephora** N. E. Br.

1. **M. crocea** (Jacq.) Schwant. Prostrate, succulent shrub, forming dense mats upto 3 dm tall; flowers terminal or axillary; petals usually orange above and purple below; fruit capsular; seeds 1 mm long with tubercles in rows. Garden escape, becoming astablished along coast, stream banks, coastal bluffs, and roadsides; coastal strand, coastal sage scrub. Native of South Africa.

4. Mesembryanthemum L.

1a. Leaves ovate to broadly spatulate, flat	1. **M. crystallinum**
1b. Leaves linear, semi-terete	2. **M. nodiflorum**

1. ***M. crystallinum** L. [**Gasoul crystallinum** (L.) Rotm.]. Very succulent annual, prostrate; branches to 6 dm long; leaves to 10 cm long; petals white, 6-8 mm long. Common along the immediate coast; coastal strand, coastal salt marsh. 3-10. Native of South Africa.

2. ***M. nodiflorum** L. [**Gasoul nodiflorum** (L.) Rotm.]. Prostrate annual, branching from the base; branches to 2 dm long; leaves to 2 cm long; flowers solitary in axils; petals white, about 4 mm long. Along the immediate coast; coastal strand, coastal salt marsh; Mugu Lagoon, Malibu Lagoon. 4-11. Native of South Africa.

5. Tetragonia L.

1. ***T. tetragonioides** (Pallas) Kuntze. [**T. expansa** Murr.]. New Zealand-Spinach. Succulent annual with spreading or procumbent branches, covered with glistening, fleshy papillae; leaves deltoid-ovate, abruptly contracted into a broad petiole; flowers axillary; calyx-tube urceolate, yellowish on inner surface. Sandy soil along the coast; coastal strand. Native of east Asia, Australia, the Pacific Islands, and southern South America.

AMARANTHACEAE

1. Amaranthus L.

1a. Inflorescence wholly of axillary glomerules	
2a. Sepals 4-5; seeds 1.5 mm across	2. **A. blitoides**
2b. Sepals 1-3; seeds less than 1 mm across	
3a. Stems erect; sepals of pistillate flowers 3, subequal	1. **A. albus**
3b. Stems prostrate; sepals of pistillate flowers 1-3, one large, the others (if pressent) scalelike	3. **A. californicus**
1b. Inflorescence terminal in dense, compound spikes, sometimes axillary also	
4a. Stems prostrate or nearly so; utricle not splitting	4. **A. deflexus**
4b. Stems erect; utricle splitting along a transverse line	5. **A. retroflexus**

1. **A. albus** L. [**A. graecizans** many auth.]. Tumbleweed. Annual to 1.5 m tall; leaves pale green, narrowly obovate to nearly round. Common in weedy and waste places and about streams and other bodies of water throughout. 6-12.

2. ***A. blitoides** S. Wats. [**A. graecizans** auct. non L.]. Annual; stems prostrate, spreading, to 0.5 m or more; leaves lanceolate to oblong. Common in weedy places as along roadsides below 2000 ft throughout. 7-12. Native of North America but introduced in our area.

3. **A. californicus** (Moq.) S. Wats. Matted annual, to 1 m or more across leaves obovate to oblong. Locally common on strand of lakes; Lake Eleanor. 9.

4. ***A. deflexus** L. Annual with slender, spreading stems; leaves to 3 cm long. Waste places along roads and in sidewalks at low elevations along the southern side of the range. 5-11. Probably native to the Old World but now widespread.

5. ***A. retroflexus** L. Rank shrubby annual to 1.5 m tall; leaves coarse, 3-10 cm long and about as wide; pistillate sepals oblong to oblanceolate, obtuse to emarginate, generally bristle-tipped, much exceeding the utricle. Abundant at low elevations, especially at margins of agricultural land. 6-11. Native of eastern North America.

ANACARDIACEAE Sumac Family

1a. Tree with pendulous branches; leaves pinnately compound; leaflets 20-40	3. **Schinus**
1b. Shrub with stiff, erect or spreading branches; leaves simple or trifoliolate	

2a. Ovary and fruit glabrous, not viscid; fruit white	
3a. Leaves trifoliate, deciduous	4. **Toxicodendron**
3b. Leaves simple, persistent	1. **Malosma**
2b. Fruit pilose and viscid; fruit reddish	2. **Rhus**

1. **Malosma** Nutt.

1. **M. laurina** (Nutt. ex T. & G.) Nutt. ex Abrams. [**Rhus laurina** Nutt. in T. & G.]. Laurel Sumac. Large shrub often 4 m tall; flowers white; fruits white, 2-3 mm in diameter. Common throughout on south-facing slopes. 6-7.

2. **Rhus** L. Sumac

1a. Leaves trifoliate, deciduous	3. **R. trilobata**
1b. Leaves simple, persistent	
2a. Leaves flat, elliptic, obtuse at apex; petioles about 0.5 cm long; fruit acid to the taste	1. **R. integrifolia**
2b. Leaves often folded along midrib, ovate, acute at apex; petioles 1-1.5 cm long; fruits sweet to the taste	2. **R. ovata**

1. **R. integrifolia** (Nutt.) Benth. & Hook. f. ex Brewer & S. Wats. Lemonadeberry. Large shrub up to 5 m tall; twigs stout; flowers rose to white; fruits ca 10 mm in diameter, reddish, viscid, densely covered by clavate glands and with scattered pilose hairs. Coastal sage scrub, chaparral; below 2000 ft, more common toward the coast and absent on the inland side of the central portion of the mountains. 2-4.

2. **R. ovata** S. Wats. Sugar Bush. Large shrub up to 3 m tall; fruits 7-8 mm in diameter, reddish, viscid, densely pilose and with more scattered clavate glands than that of **R. integrifolia.** Chaparral and southern oak woodland throughout the mountains but away from the immediate coast. 3-5. Occasional individuals intermediate between **R. ovata** and **R. integrifolia**, which occur where the two grow together, are presumably hybrids.

3. **R. trilobata** Nutt. var. **pilosissima** Engl. [**R. t.** var. **malacophylla** (Greene) Munz]. Squaw Bush. Small, open shrub about 1 m tall with pliable stems; flowers yellowish; fruits reddish. In canyon bottoms with **Platanus** and **Quercus** in riparian woodland or in openings in the chaparral, below 2000 ft and away from the coast. 3-4.

3. **Schinus** L. Pepper-Tree

1. ***S. molle** L. Peruvian-Pepper. Small to medium sized tree with rounded crown; leaves pinnately compund, 20-30 cm long; leaflets linear to linear-lanceolate, up to 4-6 cm long. Commonly cultivated and occasionally growing away from cultivation.

4. **Toxicodendron** P. Mill.

1. **T. diversilobum** (T. & G.) Greene. [**R. diversiloba** T. & G.]. Poison-Oak. Small shrub or in deep canyons a large vine with stems sometimes 6-8 cm in diameter; leaflets variable in shape and often turn bright red in the fall; flowers white; fruit whitish. Common throughout; coastal sage scrub, chaparral, southern oak woodland. 3-4.

APIACEAE Carrot Family

1a. Leaves peltate, entire	9. **Hydrocotyle**
1b. Leaves basally petiolate	
2a. Annual herbs; petals white	
3a. Leaves broadly palmately lobed, simple; plants delicate, trailing	4. **Bowlesia**
3b. Leaves compound	
4a. Plants glabrous; fruits lacking bristles, about as broad as long	
5a. Fruits finely papillose, with inconspicuous ribs	1. **Apiastrum**

5b. Fruits smooth, with very prominent ribs — 5. **Cichlospermum**

4b. Plants pubescent; fruits bristly longer than broad, if not then bristly and tuberculate

6a. Umbels lateral, opposite leaves; fruits with bristly outer carpel and tuberculate inner carpel, central fruits may be tuberculate on both carpels — 16. **Torilis**

6b. Umbels terminal; fruits bristly or scabrous

7a. Fruits 15-80 mm long; beak 3-5 times the length of seed bearing portion — 14. **Scandix**

7b. Fruits less than 7 mm long, not beaked

8a. Umbels densely branched; subtending bracts longer than rays; bristles of fruit with several retrorse barbs at very end — 7. **Daucus**

8b. Umbels loose; bracts much shorter than rays; bristles on fruit simply hooked — 17. **Yabea**

2b. Perennial herbs

9a. Plants slender, creeping; leaves simple — 9. **Hydrocotyle**

9b. Plants not creeping; leaves compound

10a. Plants with the odor of anise; flowering stems at least 1 m tall; leaf divisions filiform; flowers yellow — 8. **Foeniculum**

10b. Plants not anise-scented; leaf divisions not filiform

11a. Flowers white

12a. Fruits much longer than broad, unwinged, densely hispid with appressed ascending bristles — 12. **Osmorhiza**

12b. Fruits without bristles, about twice as long as broad

13a. Plants conspicuously strigose; fruits conspicuously winged; low perennial herb of dry places; leaves mostly basal — 10. **Lomatium**

13b. Plants glabrous or sparsely hispidulous; fruits not winged; cauline leaves well developed

14a. Stems purple-dotted; ultimate leaf divisions about 2-5 mm across; branches of umbels hispidulous — 6. **Conium**

14b. Stems not purple-dotted; ultimate leaf divisions about 1 cm across; branches of umbel glabrous; plants of wet places

15a. Leaf blades bipinnate; celery odor lacking — 11. **Oenanthe**

15b. Leaf blades pinnate; celery odor present or not

16a. Plants with celery odor and taste; styles ca 0.2 mm long — 2. **Apium**

16b. Plants without celery odor and taste; styles ca 1.0 mm long — 3. **Berula**

11b. Flowers yellow

17a. Fruits densely covered with hooked bristles — 13. **Sanicula**

17b. Fruits smooth

18a. Fruits broadly winged; ultimate leaf-segments linear or coarse — 10. **Lomatium**

18b. Fruits not broadly winged; ultimate leaf segments coarse — 15. **Tauschia**

1. **Apiastrum** Nutt.

1. **A. angustifolium** Nutt. Wild-Celery. Erect, dichotomously branched annual; umbels lacking bracteoles, with one or two subsessile flowers in the axil of each umbel; flowers white. Occasional at low elevations throughout, under shrubs; especially common on burns. 4-5.

2. **Apium** L.

1. ***A. graveolens** L. Celery. Perennial herb; stem grooved; petioles short, the main branches of

the compound umbel long; flowers white; fruits ca 1.5 mm long. Occasional in wet places at low elevations throughout; channel riparian, freshwater marsh. 5-9. Native of the Old World; widely cultivated.

3. **Berula** Hoffm.

1. **B. erecta** (Huds.) Cov. Glabrous perennial to 8 dm tall; flowers white. Rare in wet ground; Lake Sherwood, Elysian Park. 9.

4. **Bowlesia** Ruiz & Pav.

1. ***B. incana** Ruiz & Pav. [**B. septentrionalis** Coult. & Rose]. Annual with stellate pubescence; umbels few-flowered, axillary, inconspicuous; flowers white; plants covered with fine stellate hairs. Shaded banks; Topanga Canyon to Griffith Park. 3-4. Native of South America.

5. **Ciclospermum** Lag.

1. ***C. leptophyllum** (Pers.) Sprague. [**Apium leptophyllum** (Pers.) F. Muell. ex Benth. & Muell.]. Decumbent annual; flowers white. Occasional weed about cultivation; Santa Monica and Los Angeles. 5-7. Throughout the warmer parts of the World, native region unknown.

6. **Conium** L.

1. ***C. maculatum** L. Poison-Hemlock. Rank biennial weed of fertile, damp soil, 1-3 m tall; leaves large, finely dissected; flowers white. Widely scattered at low elevations. 5-7. Native of Eurasia and north Africa. Very poisonous.

7. **Daucus** L.

1. **D. pusillus** Michx. Rattlesnake Weed. Erect annual, mostly 1-5 cm tall; leaves finely divided; flowers white. Scattered on grassy slopes at low elevations throughout, not common. 4-5.

8. **Foeniculum** Adans.

1. ***F. vulgare** L. Fennel. Coarse clumped perennial or biennial herb with finely dissected leaves; flowers yellow. Frequent in waste places and along roads throughout. 5-9. Native of the Mediterranean region.

9. **Hydrocotyle** L.

1a. Leaves not peltate 1. **H. moschata**
1b. Leaves peltate 2. **H. umbellata**

1. ***H. moschata** Forst. f. Slender, creeping perennial herb. Weed of lawns, occasionally escaping and becoming naturalized in moist habitats; Brentwood, Bel Air. Native of New Zealand.

2. **H. umbellata** L. Matted perennial herb; leaves peltate; peduncles arising from creeping rootstock; leaves mostly 1-3 cm across. Moist ground around gardens; West Los Angeles-Santa Monica area. 5-6.

10. **Lomatium** Raf.

1a. Leaves leathery, bipinnate, with ultimate divisions coarsely serrate, mostly 1.5-3 cm wide 2. **L. lucidum**
1b. Leaves soft, decompound, with ultimate divisions 1-2 mm wide
  2a. Flowers yellow; plants subglabrous; mature fruits elliptical 3. **L. utriculatum**
  2b. Flowers white; plants covered with a thin tomentum; mature fruits suborbicular 1. **L. dasycarpum**

1. **L. dasycarpum** (T. & G.) Coult. & Rose. Perennial herb, 1-4 cm tall; petals greenish to greenish yellow but appearing white due to pubescence. Occasional in grassy openings along the main ridge

and northern slope of the mountains from Topanga Canyon west. 3-4.

2. **L. lucidum** (Nutt.) Jeps. Perennial herb; leaves subbasal; flowers yellow. Local on rocky slopes away from the immediate coast, sometimes prominent on burns; from Topanga Canyon westward. 1-3.

3. **L. utriculatum** (Nutt.) Coult. & Rose. Perennial herb; stems leafy, 1-5 cm tall; bractlets subovate; flowers yellow. Grassy slopes and flats at low elevations on the northern slope of the mountains from Topanga Canyon westward. 3-4.

11. **Oenanthe** L. Dropwort

1. **O. sarmentosa** Presl. Lush perennial with axillary umbels; flowers white. Forming colonies in permanently wet, shaded places; Los Angeles River. 6-7.

12. **Osmorhiza** Raf. Sweet-Cicely

1. **O. brachypoda** Torr. Pubescent perennial, growing in clumps; roots fascicled; leaves mostly cauline, well dissected but the divisions coarse; umbels subtended by several bractlets ca 6 mm long; flowers greenish yellow; fruit 1-2 cm long. Rare, shaded flats in oak woodland; scattered throughout. 3-4.

13. **Sanicula** L. Snakeroot, Sanicle

1a. Leaves finely dissected, with ultimate divisions 1-2 mm wide
  2a. Plants from a globose tuber ca 1 cm in diameter; the underground stem above it pale, smooth; pedicels of the numerous staminate flowers elongating to ca 4 mm and conspicuously exceeding the young fruits 4. **S. tuberosa**
  2b. Plants from a roughened, dark brown taproot; pedicels of staminate flowers much shorter than fruits 2. **S. bipinnata**
1b. Leaves coarsely dissected, with ultimate divisions usually at least 4 mm wide
  3a. Umbels 2-4 mm across in flower, each with ca 8-13 flowers; main leaf segments often not deeply dissected 3. **S. crassicaulis**
  3b. Umbels 6-8 mm across in flower, each with ca 20 flowers; main leaf segments deeply dissected 1. **S. arguta**

1. **S. arguta** Greene ex Coult. & Rose. Perennial herb, 1-3 (-5) dm tall; flowering stalks often no longer than the leaves; flowers bright yellow. Common on open grassy slopes throughout. 2-4.

2. **S. bipinnata** H. & A. Poison Sanicle. Erect perennial herb; about 3 dm tall; flowers yellow. Rare; open grassland; near Griffith Park, Santa Monica. 4.

3. **S. crassicaulis** Poepp. ex DC. Erect perennial, (2-) 3-8 dm tall; flowers pale yellow. Shaded slopes in oak woodland back of the immediate coast, occasional at low elevations throughout. 2-4.

4. **S. tuberosa** Torr. Perennial, mostly 3-5 dm tall; flowers yellow, with a very strong odor. Local on vernally moist grassy slopes in shallow soil along the summit ridge and north side of the range; Griffith Park to Conejo Mountain. 3-4.

14. **Scandix** L.

1. ***S. pecten-veneris** L. Shepherd's Needle. Annual to 25 cm tall; leaves pinnately decompound, finely dissected; flowers white; fruit to 60 mm long, seed bearing portion ca 10 mm long. Rare adventive, Malibu Creek State Park, **Thomas 569** (LA). Native to Europe.

15. **Tauschia** Schlecht.

1a. Leaves simply pinnate or occasionally a few of the basal leaflets divided; fruit oblong, 6-9 mm long 1. **T. arguta**
1b. Leaves doubly pinnate, all of the leaflets divided; fruits suborbicular,

4-7 mm long **2. T. hartwegii**

1. **T. arguta** (T. & G.) Macbr. Short caulescent perennial herb; flowers yellow. Occasional on rocky banks, roadcuts, or openings in chaparral away from the imediate coast; throughout. 2-4.
2. **T. hartwegii** (A. Gray) Macbr. Acaulescent perennial herb; flowers yellow. Shaded slopes in oak woodland or occasionally under chaparral, local at low elevations away from the coast; from the drainage of Malibu Creek eastward. 3-4.

16. **Torilis** Adans. Hedge-Parsley

1. ***T. nodosa** (L.) Gaertn. Erect, few-branched annual; stems retrosely scabrous; leaves pinnately decompound; umbels short pedunculate, opposite the leaves; flowers white; fruits 2-3 mm long. Rare adventive; Point Dume, **Koutnik 417** (DAV). 4-6. Native of southern and western Europe.

17. **Yabea** K.-Pol.

1. **Y. microcarpa** (H. & A.) K.-Pol. [**Caucalis microcarpa** H. & A.]. Erect annual, mostly 1-3 cm tall; leaves finely divided; flowers white. Rare on grassy openings and slopes under bushes, north slope of western end of the range. 4-5.

APOCYNACEAE Dogbane Family

1a. Flowers greenish-white, terminal, clustered **1. Apocynum**
1b. Flowers bluish to violet, axillary, single **2. Vinca**

1. **Apocynum** L. Dogbane

1. **A. cannabinum** L. var. **glaberrinum** A. DC. Glabrous erect perennial herb with opposite shiny leaves; corollas 2-3 mm long, greenish-white; pods pendulous, 1-2 dm long. Tangled vegetation along lower Malibu Creek and Malibu State Park. 6-8.

2. **Vinca** L. Periwinkle

1. ***V. major** L. Evergreen perennial herb with creeping rootstalks and glabrous, petiolate, glossy, opposite, dark green leaves; flowers long-stalked; corollas ca 2.5-3 cm long, bluish to violet. Cultivated and locally established on shaded slopes and in canyons at low elevations throughout. 3-7. Native of Europe.

ASCLEPIADACEAE Milkweed Family

1. **Asclepias** L. Milkweed

1a. Leaves mostly 4-8 cm wide, densely hairy
  2a. Lobes around central column (hoods) yellowish, with hornlike projection **2. A. eriocarpa**
  2b. Lobes purple, without a hornlike projection **1. A. californica**
1b. Leaves less than 1 cm wide, subglabrous **3. A. fascicularis**

1. **A. californica** Greene. Perennial herb, mostly ca 4 dm tall; stems sprawling at base; leaves opposite; entire plant very tomentose; flowers white-wooly with purplish corolla lobes; follicles to 1 dm long. Colonial on rocky slopes in chaparral, north slopes of west end of range. 3-6.

2. **A. eriocarpa** Benth. Erect perennial up to ca 6 dm tall; leaves opposite or several at a node; flowers creaam-colored; pods tomentose, thick, to 1 dm long. Colonial, in open places at low elevations from Topanga Canyon east. 5-8.

3. **A. fascicularis** Dcne. in A. DC. Erect perennial up to 1 m tall; leaves verticillate; flowers greenish-white; pods subglabrous, 6-9 cm long. Common throughout in ± open disturbed places. 5-10.

ASTERACEAE Sunflower Family

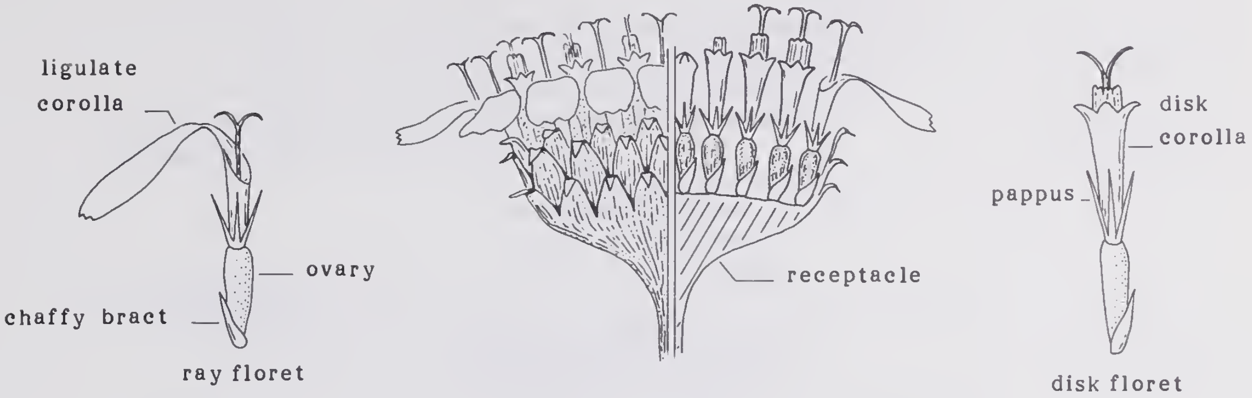

Fig. 16. Generalized inflorescence of the Asteraceae

Key to Tribes

1a. Flowers all ligulate; juice milky or colored	V. Cichorieae
1b. Flowers not all ligulate, juice not milky or colored	
2a. Flowers all 2-lipped, purplish	IX. Mutisieae (3. **Acourtia**)
2b. Flowers all regular or the marginal ones ligulate	
3a. Plants spiny; ligulate marginal flowers none; heads conspicuous; flowers purple, pinkish, or bright yellow	IV. Cardueae
3b. Plants not in all respects as above	
4a. Anthers free from one another; flowers small, greenish, unisexual, with the staminate ones in terminal spikes or racemes	VII. Heliantheae
4b. Anthers united to one another	
5a. Anthers tailed at the base; corollas all tubular; plants more or less white woolly (except in 61. **Pluchea**); flowers inconspicuous or purple	VIII. Inuleae
5b. Anthers truncate or shallowly sagittate at the base; corollas tubular or the marginal ones ligulate	
6a. Receptacle with scales or bristles ("chaffy bracts") among the flowers	
7a. Leaves finely dissected; rays white; pappus none	I. Anthemideae
7b. Not in all respects as above	VII. Heliantheae
6b. Receptacle without bracts of any kind among the flowers	
9a. Plants dioecious; shrubs or rank herbs with white flowers	II. Astereae (12. **Baccharis**)
9b. Plant not dioecious; the flowers hermaphroditic	
10a. Style branches subterete and clavate; involucral bracts conspicuously lined; heads lacking ray flowers; flowers white or pinkish; shrubs	VI. Eupatorieae
10b. Style branches not subterete or clavate	
11a. Inconspicuous annual; style persistent, spine-like	I. Anthemideae (67. **Soliva**)
11b. Style not persistent and spine-like	

12a. Phyllaries dry or with a wide scarious margin; pappus a short crown or none	I. Anthemideae
12b. Phyllaries herbaceous or firm; pappus various	
13a. Phyllaries in few to many series, well imbricated	
14a. Shrub with cordate, long-petioled leaves; flowers yellow	VII. Heliantheae (73. **Venegasia**)
14b. Not in all respects as above	
15a. Sprawling perennial salt marsh plant with entire fleshy opposite leaves	VII. Heliantheae (45. **Jaumea**)
15b. Not in all respects as above	
16a. Fall-blooming shrub with scale-like leaves and broom-like branches; flowers golden-yellow	X. Senecioneae (50. **Lepidospartum**)
16b. Not in all respects as above; leaves sometimes needle-like	II. Astereae
13b. Phyllaries subequal, mostly in 1 or 2 series, little or not imbricated	
17a. Achenes all alike; pappus present or absent	
18a. Perennials with purple rays and yellow disks	II. Astereae
18b. Not in all respects as above	
19a. Pappus of copious capillary bristles	
20a. Flowers yellow	X. Senecioneae
20b. Flowers white or greenish	II. Astereae (29. **Erigeron**)
19b. Pappus awn-like, bristly, scale-like, or none	
20a. Plants perennial	
21a. Leaves entire	VII. Heliantheae
21b. Leaves dissected	X. Senecioneae (30. **Eriophyllum**)
20b. Plants annual	X. Senecioneae
17b. Achenes not all alike; pappus absent	III. Calenduleae

I. ANTHEMIDEAE

1a. Heads with rays	
2a. Rays golden-yellow or cream-colored; disk flowers greenish-yellow; receptacle lacking chaffy bracts	17. **Chrysanthemum**
2b. Rays white; disk flowers golden-yellow; receptacle with chaffy bracts among the flowers	
3a. Heads solitary at ends of the branches; rays 5-11 mm long; leaves subglabrous; plants annual	9. **Anthemis**
3b. Heads in corymbose compound inflorescences; rays 3-4 mm long; leaves silky pubescent; plants perennial	1. **Achillea**
1b. Heads lacking rays	
4a. Heads solitary or pedunculate	

5a. Achenes tipped with hardened persistent style; heads greenish, sessile in the branches of the stem	67. **Soliva**
5b. Achenes not tipped with hardened persistent style; heads pedunculate	
6a. Receptacle conical; marginal achenes sessile, with corollas; pappus a short paleaceous crown	53. **Matricaria**
6b. Receptacle flat; marginal achenes long-stalked, lacking corollas; pappus none	25. **Cotula**
4b. Heads in large racemose inflorescences	10. **Artemisia**

II. ASTEREAE

1a. Rays present, yellow, sometimes small; disk corollas yellow	
2a. Leaves sharply serrate, clasping at the base; involucres multiseriate, with numerous sharp-pointed reflexed sticky bracts	34. **Grindelia**
2b. Leaves not sharply serrate; involucres not glutinous	
3a. Pappus of 10-12 oblong free scales, 1-2 mm long; leaves glutinous, 1-2 mm wide; low shrub	35. **Gutierrezia**
3b. Pappus of free capillary bristles; leaves often wider	
4a. Pappus in 2 series, the inner of numerous capillary bristles ca 5 mm long, the outer of a ring of inconspicuous short bristles 0.5-1 mm long; plants hirsute with long hairs	
5a. Ray achenes pubescent, with copious pappus	18. **Chrysopsis**
5b. Ray achenes subglabrous; pappus deciduous or lacking	41. **Heterotheca**
4b. Pappus not of 2 kinds; plants glabrous or short-pubescent	
6a. Perennials, often shrubby	
7a. Plants with rhizomes, herbaceous	66. **Solidago**
7b. Plants without rhizomes, distinctly woody	36. **Haplopappus**
6b. Slender annual with nodding heads	58. **Pentachaeta**
1b. Rays lacking or not yellow	
8a. Plants annual; rays inconspicuous; involucres 3-6 mm high	
9a. Rays pinkish; achenes ca 3 mm long, brownish, with 4 conspicuous white ribs	11. **Aster**
9b. Rays white or greenish; achenes ca 2 mm long, compressed with 2 ribs	22. **Conyza**
8b. Plants perennial, often shrubby; involucres sometimes larger	
10a. Heads lacking rays	
11a. Flowers bright yellow, hermaphroditic	
12a. Phyllaries arranged in ± distinctly vertical ranks	19. **Chrysothamnus**
12b. Phyllaries imbricate	36. **Haplopappus**
11b. Flowers green or whitish; plants dioecious; staminate flowers with a pappus consisting of tiny club-shaped bristles	12. **Baccharis**
10b. Heads with conspicuous lavender or bluish rays; disk flowers yellow	
13a. Involucres clearly imbricated, the phyllaries in several overlapping series; foliage or branches white-pubescent or glandular	24. **Corethrogyne**
13b. Involucres not or only slightly imbricate, the narrow phyllaries in a single series; stems and leaves glabrous or sparsely short-hispid	29. **Erigeron**

III. CALENDULEAE

1a. Disk flowers fertile; ray flowers orange-yellow	26. **Dimorphotheca**
1b. Disk flowers sterile; rays flowers white above, purple below	57. **Osteospermum**

IV. CARDUEAE

- 1a. Leaves dark shining green with conspicuous white blotches; flowers purple — **65. Silybum**
- 1b. Leaves not white-mottled; flowers of various colors
  - 2a. Leaves without spines on margins; heads 1.5-2 cm high; pappus setose
    - 3a. Annual with a fibrous taproot; some of the involucral bracts with a spine at tip; flowers yellow — **15. Centaurea**
    - 3b. Perennial with creeping rootstock; involucral bracts without a long spine at tip; flowers blue to pink or white — **4. Acroptilon**
  - 2b. Leaves with spines on margins; heads 3-6 cm high; pappus plumose
    - 4a. Phyllaries enlarged at base, broad; receptacle fleshy — **26. Cynara**
    - 4b. Phyllaries narrower; receptacle not fleshy — **21. Cirsium**

V. CICHORIEAE

- 1a. Pappus composed of scales, which in some cases terminate in bristles
  - 2a. Flowers bright blue; heads subsessile; plants perennial — **20. Cichorium**
  - 2b. Flowers yellow; heads long-pedunculate or scapose; plants annual
    - 3a. Principal phyllaries hardened in fruit, enveloping the outer achene — **37. Hedypnois**
    - 3b. Phyllaries not hardened in fruit, not enveloping the achenes — **55. Microseris**
- 1b. Pappus of capillary bristles, these sometimes plumose
  - 4a. Flowers white; inflorescence well-branched
    - 5a. Annual; pappus long-plumose; achene with a long beak — **63. Rafinesquia**
    - 5b. Perennial; pappus capillary; achene not beaked — **52. Malacothrix saxatilis**
  - 4b. Flowers not white; inflorescence well-branched or not
    - 6a. Flowers lavender-pink or purple; pappus bristles plumose
      - 7a. Achene with a long beak; head pedunculate — **72. Tragopogon**
      - 7b. Achene with no beak; heads subsessile — **69. Stephanomeria**
    - 6b. Flowers yellow
      - 8a. Heads on long erect scapes from a basal rosette
        - 9a. Pappus setae long-plumose — **43. Hypochoeris**
        - 9b. Pappus setae capillary
          - 10a. Leaves not gray-pubescent; inner phyllaries 1-1.5 cm long; achenes 4-5 ribbed, spinulose-muriculate near summit — **71. Taraxacum**
          - 10b. Leaves gray-pubescent; inner phyllaries 2-3 cm long; achenes 10-15 nerved, not spinulose-muriculate — **6. Agoseris**
      - 8b. Heads not on naked scapes arising from the base
        - 11a. Plants with a circle of ovate outer phyllaries subtending the narrow inner ones; pappus setae plumose — **60. Picris**
        - 11b. All phyllaries approximately equal in width; pappus setae capillary
          - 12a. Achenes beaked — **46. Lactuca**
          - 12b. Achenes not beaked
            - 13a. Achenes strongly flattened — **68. Sonchus**
            - 13b. Achenes not strongly flattened
              - 14a. Annual, much branched from base; glabrous — **52. Malacothrix clevelandii**
              - 14b. Perennial; stems simple; leaves villous — **42. Hieracium**

VI. EUPATORIEAE

- 1a. Leaves opposite, petioles 2-4 cm long; achenes 5-angled — **5. Ageratina**
- 1b. Leaves alternate, petioles less than 1 cm long; achenes 10 nerved — **14. Brickellia**

VII. HELIANTHEAE

1a. Anthers free; flowers small, greenish, unisexual, with the staminate ones in terminal spikes
2a. Heads unisexual; involucre of female heads nutlike or burlike
3a. Phyllaries of staminate heads united; annual or perennial 8. **Ambrosia**
3b. Phyllaries of staminate heads free; annual 75. **Xanthium**
2a. Heads bisexual; female involucre not becoming burlike 44. **Iva**
1b. Anthers connivent; flowers generally yellowish, sometimes whitish; disk flowers perfect
4a. Receptacle with chaffy bracts
5a. Phyllaries in 1 to several series, none enfolding ray achenes
6a. Pappus of 2-4 retrorsely barbed awns; leaves pinnately compound or simple 13. **Bidens**
6b. Pappus various, but not of retrorsely barbed awns; leaves simple or finely dissected
7a. Leaves dissected; phyllaries glabrous, in 2 series, the outer ones short, spreading 23. **Coreopsis**
7b. Leaves not dissected; phyllaries pubescent, more or less imbricate, but not in 2 distinct series
8a. Rays white; heads 3-4 mm high; slender annual 32. **Galinsoga**
8b. Rays yellow or absent; heads larger; rank annuals or perennials
9a. Achenes of disk flowers flattened, pubescent, with a conspicuous margin
10a. Margin of disk achenes hyaline but not ciliate; rank annual weed 74. **Verbesina**
10b. Margin of disk achenes ciliate; native shrub 28. **Encelia**
9b. Achenes of disk flowers quadrangular in transection, glabrous, lacking a margin 39. **Helianthus**
5b. Phyllaries mostly uniseriate, each partly or completely enclosing its ray achene (Subtribe Madiinae)
11a. Ray achenes obcompressed (flattened parallel to the margin of the head), each hidden within its phyllary, the abruptly enfolded margins of which overlap
12a. Pappus oblong, obtuse, the inner scales 7-9 mm long, silvery; rays with inconspicuous yellow ligules, fading reddish 2. **Achyrachaena**
12b. Pappus of bristles or absent
13a. Pappus of 18-32 bristles; involucre 4.4-6.7 mm high; plants densely gray-pubescent; flowers remaining open all day 49. **Layia**
13b. Pappus absent; involucre 6-12 mm high; plants hispid; flowers closed by midday 47. **Lagophylla**
11b. Ray achenes not obcompressed, often not hidden completely by lateral margins of enfolding phyllary
14a. Ray achenes laterally compressed, completely enfolded by the deeply grooved subtending phyllary; basal leaves subentire 51. **Madia**
14b. Ray achenes not laterally compressed, only partly enfolded by the subtending phyllary; basal leaves pinnatifid or toothed 40. **Hemizonia**
4b. Receptacle without chaffy bracts
15a. Leaves cordate, dentate, long petioled 73. **Venegasia**
15b. Leaves not cordate
16a. Sprawling salt marsh plant; stems fleshy; leaves opposite; pappus absent 45. **Jaumea**
16b. Plants not fleshy; leaves alternate; pappus present 38. **Helenium**

VIII. INULEAE

1a. Flowers white or yellow, inconspicuous; herbage tomentose
2a. Receptacle without bracts; plants perennial or annual — 33. **Gnaphalium**
2b. Receptacle with bracts, at least near its margin; annual
3a. Bracts containing fertile flowers covered with very loose deep wool; achenes swollen on one side; style and corolla laterally attached — 54. **Micropus**
3b. Wool of bracts dense but not very loose; achenes straight-sided; style and corolla apically attached
4a. Leaves alternate; receptacle nearly flat
5a. Each flower subtended by a bract; pappus of sterile central flowers rudimentary — 70. **Stylocline**
5b. Central flowers 12-20, not subtended by bracts; pappus of sterile central flowers well-developed — 31. **Filago**
4b. Leaves opposite; involucre subglobose — 62. **Psilocarphus**
1b. Flowers purple, conspicuous; herbage not tomentose — 61. **Pluchea**

IX. MUTISIEAE

Only one genus of Mutiseae occurs in the Santa Monica Mountains — 3. **Acourtia**

X. SENECIONEAE

1a. Phyllaries in few to many series, well imbricated — 50. **Lepidospartum**
1b. Phyllaries subequal, mostly in 1 or 2 series, little or not imbricated
2a. Pappus of copious capillary bristles — 64. **Senecio**
2b. Pappus awn-like, bristly, scale-like, or none
3a. Rays white; disks yellow; plants branched, glandular pubescent; long-lived annual — 58. **Perityle**
3b. Rays yellow or absent
4a. Plants perennial; leaves dissected; rays present — 30. **Eriophyllum**
4b. Plants annual; rays present or absent
5a. Leaves all opposite; rays present — 48. **Lasthenia**
5b. Leaves alternate, at least above; rays present or absent
6a. Rays present; plants densely lanate above — 56. **Monolopia**
6b. Rays absent; plants not densely lanate above
7a. Leaves entire; involucres 3-5 mm high; plants aromatic — 7. **Ambylopappus**
7b. Leaves deeply divided; involucres 7-12 mm high; plants not aromatic — 16. **Chaenactis**

1. **Achillea** L. Yarrow

1. **A. millefolium** L. var. **californica** (Poll.) Jeps. [**A. borealis** Bong. subsp. **californica** (Poll.) Keck]. Perennial aromatic herb to 1 m tall; leaves much dissected; involucres 5-6 mm high; ray flowers white; disk flowers yellow. Rare in open places, as in southern oak woodland; away from the coast throughout. 4-6.

2. **Achyrachaena** Schauer

1. **A. mollis** Schauer. Blow-Wives. Annual, 1-4 dm tall; leaves subentire; heads oblong at anthesis, 1.5-2 cm high; rays yellow becoming reddish; achenes 10-ribbed, scabrous, ca 5 mm long; pappus of 10 scales, the outer 5 half the length of the inner ones. Rare on open grassy slopes; Malibu Creek, Sepulveda Canyon. 4.

3. **Acourtia** D. Don

1. **A. microcephala** DC. [**Perezia microcephala** (DC.) A. Gray]. Stout, perennial herb to over 1 m tall; leaves alternate, broadly clasping, serrulate, scabrid and glandular, 1-2 dm long, 3-8 cm wide; corollas purplish; pappus white, of numerous soft, scabrous bristles. Fairly common in

coastal sage scrub; occasional in chaparral and southern oak woodland; Sepulveda Canyon westward. 5-8.

4. **Acroptilon** Cass.

1. ***A. repens*** (L.) DC. [**Centaurea repens** L.] Russian Knapweed. Perennial herb, 0.5-1 m tall; stems ridged; leaves sinuate-margined to entire; flowers blue to pink or white. Local weed in waste ground; Santa Monica. Native of Central Asia. 6-10.

5. **Ageratina** Spach.

1. ***A. adenophorum*** (Spreng.) King & Robbins. [**Eupatorium adenophorum** Spreng.]. Straggling shrub ca 1 m tall; leaves deltoid, cuneate at base, ca 5 cm long; heads in dense cymose clusters; flowers white, turning pink with age. Frequent and well established weed about plantings in the vicinity of Griffith Park, Elysian Park, and West Los Angeles. Escape from gardens; native of Mexico. 1-12.

6. **Agoseris** Raf. Mountain-Dandelion

1. **A. grandiflora** (Nutt.) Greene. Perennial herb with robust scapes, to 0.6 m tall; leaves 1-2.5 dm long, entire to laciniate; flowers yellow. Occasional at lower elevations along northern slope of western end of mountains from the vicinity of Lake Sherwood to Topanga Canyon; in southern oak woodland and open spots in chaparral; also lower Topanga Canyon. 4-6.

7. **Amblyopappus** H. & A.

1. **A. pusillus** H. & A. Low, sticky, aromatic annual, mostly less than 2 dm tall; flowers yellow, inconspicuous; pappus paleaceous, 0.5 mm long. Rare on sandy flats just above the beach, Point Dume. 3-4.

8. **Ambrosia** L. Ragweed

1a. Fruiting involucre unarmed or with a single row of tubercles below the single beak ..... 4. **A. psilostachya**
1b. Fruiting involucre with several rows of spines below the 1-4 beaks
  2a. Plants annual; fruits densely covered with flattened spines ca 3 mm long ..... 1. **A. acanthicarpa**
  2b. Plants perennial
    3a. Decumbent matted plants of coastal dunes; foliage silvery canescent; fruits 8-10 mm long; rhizomes absent ..... 2. **A. chamissonis**
    3b. Erect plants with green or gray-green foliage; fruits 2.5-4 mm long; rhizomes present ..... 3. **A. confertiflora**

1. **A. acanthicarpa** Hook. [**Franseria acanthicarpa** (Hook.) Cav.]. Sand-Bur. Bushy annual, 1-7 dm tall; fruits 5-10 mm long, spines flattened and shallowly grooved. Scattered throughout in sandy creek bottoms, in weedy situations and along roadsides; occasional. 8-11.

2. **A. chamissonis** (Less.) Greene. [**Franseria chamissonis** subsp. **bipinnatisecta** (Less.) Wiggins & Stockw.]. Matted perennial herb with long procumbent stems. Common; coastal strand; along the entire coast. 3-9.

3. **A. confertiflora** DC. [**Franseria confertiflora** (DC.) Rydb.]. Strictly erect herbaceous perennial to 1.2 m tall, from a rhizome; fruit obovoid, 1-2 beaked with short spines 0.5 mm long, more or less clustered. Occasional colonies in weedy ground or about plantings from the vicinity of Santa Monica eastward. 7-11.

4. **A. psilostachya** DC. Perennial 5-12 dm tall, from a running rhizome; stem and leaves covered with harsh pubescence; leaves pinnatifid; fruits single. Common throughout in more or less disturbed soil of all plant communities. 8-10.

9. **Anthemis** L.

1. ***A. cotula** L. Mayweed. Strong-scented annual with finely dissected leaves; heads 1.5-2 cm across; ray flowers white; disk flowers yellow. Rare weed of waste places in fertile soil at low elevations. Native of Europe. 5-9.

10. **Artemisia** L. Sagebrush, Wormwood

1a. Well branched woody shrub; leaves palmately parted into linear segments less than 1 mm wide — 2. **A. californica**
1b. Annuals or rhizomatous perennials; leaves at least 2 mm wide
  2a. Leaves glabrous or nearly so
    3a. Rhizomatous perennial; leaves entire — 4. **A. dracunculus**
    3b. Tap-rooted annual; leaves deeply serrately divided — 1. **A. biennis**
  2b. Leaves tomentose below, green and nearly glabrous above — 3. **A. douglasiana**

1. ***A. biennis** Willd. Erect annual or biennial, to 1 m tall; leaves mostly 2-5 cm long. Borders of salt marsh, Point Mugu. Probably a native of northwestern North America. 9-10.

2. **A. californica** Less. California Sagebrush. Gray-pubescent woody shrub to 1.5 m tall. Co-dominant in coastal sage scrub and occurring throughout, but rarely above 2000 ft. 8-2.

3. **A. douglasiana** Bess. Erect, rhizomatomous perennial to 2 m tall; leaves mostly 7-15 cm long, broad, entire or coarsely lobed or toothed above. Common in coastal sage scrub, southern oak woodland, riparian woodland; in more or less protected places throughout; sometimes prominent on burns. 7-11.

4. **A. dracunculus** L. Perennial with erect stems to 1.5 m tall; leaves 2-5 cm long. Occasional at lower elevations in more or less open slopes and flats throughout; mostly in coastal sage scrub and southern oak woodland. 8-10.

11. **Aster** L. Aster

1. **A. subulatus** Michx. var. **ligulatus** Shinners. [**A. exilis** Ell.]. Erect glabrous annual to 1.5 m tall, openly branched above; leaves linear or lanceolate, 5-12 cm long, 0.1-12 cm long, 0.2-1 cm wide; panicle of heads diffuse; phyllaries with translucent midnerve, hyaline; ray flowers numerous, ca 1-2 mm long, white to pinkish; disk flowers yellow. Rare, in moist places along dry creeks and lakes; intermittent streambed, freshwater marsh, edges of coastal salt marsh; Calleguas Creek, Point Mugu, Franklin Canyon Reservoir. 8-11.

12. **Baccharis** L.

1a. Herbage and stems glabrous; leaves entire or serrate
  2a. Leaves entire or serrulate, lanceolate, sharp-pointed
    3a. Plants tall but herbaceous to the base; achenes minutely viscid-puberulent — 1. **B. douglasii**
    3b. Plants distinctly woody; achenes glabrous — 4. **B. salicifolia**
  2b. Leaves with 5-9 prominent teeth, obovate — 2. **B. pilularis**
1b. Herbage and stems pubescent; leaves serrate — 3. **B. plummerae**

1. **B. douglasii** DC. Suffrutescent perennial, 1-2 m tall; heads in terminal corymbose clusters; flowers white; achenes to 1 mm long. Wet places; Los Angeles River, Griffith Park. 4-10.

2. **B. pilularis** DC. subsp. **consanguinea** (DC.) C. B. Wolf. Coyote Bush. Shrub 1-3 m tall; flowers white; achenes 1.3-1.5 mm long, glabrous. Frequent near the coast below 2000 ft; coastal sage scrub, southern oak woodland, and margins of coastal salt marsh; throughout. 8-11.

3. **B. plummerae** A. Gray. Low shrub to 0.7 m tall; foliage dark green; achenes 2.7-3.2 mm long, viscid-puberlent. Local in shaded canyons usually near the coast from the west end of the mountains to Cahuenga Pass. A local plant that ranges north to the Santa Ynez Range and is also on Santa Cruz Island. 8-10.

4. **B. salicifolia** (Ruiz &Pavon) Pers. [**B. glutinosa** (Ruiz & Pav.) Pers. [**B. viminea** DC.]. Mule Fat. Erect woody shrub 2-4 m tall; flowers white; achenes less than 1 mm long. Common in coastal sage, southern oak woodland, riparian woodland, disturbed areas in chaparral, and about streams and lakes throughout. 1-12.

13. **Bidens** L. Bur-Marigold

1a. Leaves pinnately 3-5 parted; rays inconspicuous or lacking
  2a. Leaves subglabrous; achenes flattened, ca 2 mm in diameter, 2-awned; wet places 1. **B. frondosa**
  2b. Leaves harsh-pubescent beneath; achenes quadrangular in transection, ca 1 mm in diameter, 2-4 awned; weedy situations 3. **B. pilosa**
1b. Leaves simple, coarsely toothed; rays 2-3 cm long 2. **B. laevis**

1. **B. frondosa** L. Stick-Tight. Nearly glabrous annual; outer phyllaries ca 8, foliaceous, ciliate; achenes brownish-black. Wet places near Lake Sherwood. 8-10.

2. **B. laevis** (L.) B.S.P. Stout glabrous annual or perennial; outer phyllaries prominent, 6-9; rays usually 8. Rare in wet sandy places; intermittent streambed; Los Angeles River, Calleguas Creek. 8-12.

3. ***B. pilosa** L. Beggar-Ticks. More or less pubescent annual; outer phyllaries relatively inconspicuous; achenes brown. Frequent in weedy places in eastern half of the mountains and along the entire coast; sporadic elsewhere. Native of the American tropics. 2-11.

14. **Brickellia**

1a. Heads 6-10 mm high; phyllaries lanceolate, ascending, subglabrous 1. **B. californica**
1b. Heads ca 15 mm high; phyllaries ovate, the outer ones with recurved tips, densely tomentose 2. **B. nevinii**

1. **B. californica** (T. & G.) A. Gray. Erect shrub ca 1 m tall; leaves sparsely pubescent to densely tomentose, short-petiolate, 1-4 cm long. Some of the variability of this species might be explained by introgressive hybridization with **B. nevinii**, with which it was found growing at several localities. Common throughout; coastal sage scrub, chaparral, or more or less disturbed habitats such as roadside banks, gulleys and in other associations. 8-11.

2. **B. nevinii** A. Gray. Densely branched, spreading shrub to 0.5 m tall; leaves densely tomentose, subsessile, 5-15 mm long. Scattered colonies in openings in chaparral or coastal sage scrub on roadside banks, 800-1800 ft; from Boney Ridge to Mandeville Canyon. 9-11.

15. **Centaurea** L. Star-Thistle

1a. Phyllary spine slender, purplish, 4-8 mm long; corolla glandular 1. **C. melitensis**
1b. Phyllary spine stout, yellow, 10-20 mm long; corolla not glandular 2. **C. solstitialis**

1. ***C. melitensis** L. Yellow Starthistle, Tocalote. Erect annual, to 8 dm tall; stems winged by bases of decurrent leaves; leaves deeply sinuate-margined below to entire above; corollas glandular, yellow. Common throughout in open more or less disturbed ground. Native of the Mediterranean region. 5-7.

2. ***C. solstitialis** L. Barneby's-Thistle. Cottony-pubescent annual branched from base; stems winged by bases of decurrent leaves; leaves deeply lobed below to entire above; corolla bright yellow, without glands. Disturbed places. Native of Europe.

16. **Chaenactis** DC.

1a. Flowers white or pinkish; plants 3-15 dm tall; pappus lacking 1. **C. artemisiaefolia**
1b. Flowers bright yellow; plants 1-4 dm tall; pappus of 4 (5) paleaceous scales 2. **C. glabriuscula**

1. **C. artemisiaefolia** (Harv. & Gray) A. Gray. Stout annual, openly branching above, glandular-hirsute in upper portion; involucres 9-12 mm high, densely glandular pubescent; corollas of marginal

flowers not distended. Occasional on open or disturbed places, often flourishing on burns; chaparral; from near Triunfo Pass east to Sepulveda Canyon. 4-6.

2. **C. glabriuscula** DC. var. **glabriuscula.** Annual, thinly floccose, some glabrate; involucre 7-10 mm high; marginal corollas with flaring limb. Common on sandy flats just behind the coast; Point Dume; occasional in open slopes in chaparral elsewhere. 4-6.

17. **Chrysanthemum** L.

1. ***C. coronarium** L. Garland Chrysanthemum. Stout annual, subglabrous, erect; leaves twice-pinnatifid; ray flowers yellow or cream-colored, disk flowers yellow. Infrequent weed in open places near the coast; Point Dume, Tuna Canyon, Griffith Park. 4-6. Native of Mediterranean region.

18. **Chrysopsis** (Nutt.) Ell. Golden-Aster

1. **C. villosa** (Pursh) Nutt. [**Heterotheca villosa** (Pursh) Shinners]. Perennial herb to 1 m tall, branched, slightly woody at the base; leaves 1-2 cm long, hairy; flowers golden-yellow. The following two varieties occur in our area.

Outer series of pappus bristle-like; heads not subtended by leafy bracts 1a. var. **fastigiata**
Outer series of pappus flattened, scale-like; heads subtended by leafy bracts 1b. var. **sessiliflora**

1a. var. **fastigiata** (Greene) Hall. [**Heterotheca fastigiata** (Greene) Harms]. Disturbed coastal sage scrub from the vicinity of Santa Monica and Franklin Canyon eastward, rare. 7-11.

1b. var. **sessiliflora** (Nutt.) A. Gray. [**Heterotheca sessiliflora** (Nutt.) Shinners. Oak woodland near Lake Sherwood, rare. 7-9.

19. **Chrysothamnus** Nutt. Rabbit-Brush

1. ***C. nauseousus** (Pall.) Britton subsp. **mohavensis** (Greene) Hall & Clem. Rare fastigiately-branched shrub to 20 dm tall; flowers yellow. Canyon bottom above Westlake; southern oak woodland; probably introduced into our area. 9-10.

20. **Cichorium** L.

1. ***C. intybus** L. Chicory. Perennial herb from stout taproot; basal leaves 1-2 cm long, toothed or pinnatifid; heads ca 4 cm across; flowers blue; pappus scales minute, narrow. Infrequent; weedy places about Santa Monica and West Los Angeles. Native of Eurasia. 1-12.

21. **Cirsium** Adans. emend. DC. Thistle

1a. Leaves covered with prickles above, decurrent with broad spiny wings subequal in length to the internodes 3. **C. vulgare**
1b. Leaves more or less pubescent but lacking prickles above, very shortly decurrent if at all
  2a. Flowers pinkish, ca 2.5 mm long; heads ca 2.5-3 cm across 1. **C. californicum**
  2b. Flowers purplish, ca 3.5 cm long; heads 3-6 cm across 2. **C. occidentale**

1. **C. californicum** A. Gray. Biennial, to 2 m tall; lower side of leaves densely tomentose; heads 3-4.5 cm long. Common in open spots; coastal sage scrub, chaparral, southern oak woodland; from Sepulveda Canyon westward, but not along the immediate coast. 4-6.

2. **C. occidentale** (Nutt.) Jeps. Biennial, to 1.5 m tall; leaves tomentose, more densely so below; heads 3-5 cm long. Fairly common; coastal sage scrub, chaparral; from Malibu Creek eastward; Conejo Mountain. Not at high elevations or on the immediate coast. 3-7.

3. ***C. vulgare** (Savi) Ten. Bull Thistle. Biennial, to 2 m tall; lower side of leaves arachnoid; heads 3-5 cm long; corollas purple. Locally common in moist, more or less weedy places throughout. Native of Eurasia. 6-10.

22. **Conyza** Less.

1a. Upper and lower leaves coarsely dentate; herbage glandular viscid — 3. **C. coulteri**
1b. Upper leaves, at least, entire; herbage not glandular viscid
  2a. Involucre copiously hairy; achenes more than 1 mm long; rays 125-180 — 1. **C. bonariensis**
  2b. Involucre subglabrous; achenes less than 1 mm long; rays 25-40 — 2. **C. canadensis**

1. ***C. bonariensis** (L.) Cronq. [**Erigeron bonariensis** (L.) Cronq.]. Stout annual to 1 m tall; involucre 4-5 mm high. Not infrequent, in waste ground or about plantings throughout, below 2000 ft. Native of South America. 4-10.

2. ***C. canadensis** (L.) Cronq. [**Erigeron canadensis** L.]. Horseweed. Low to robust annual to 2 m tall; involucre 3-4 mm high; phyllaries with conspicuous oil-filled central area. Common throughout in more or less disturbed waste or open ground or about plantings. Native of eastern North America. 5-12.

3. **C. coulteri** Gray. Erect annual, 2-10 dm tall, invol 2-3 mm high; scattered in marshy or moist areas, freshwater marsh; Mugu Lagoon, **Gustafson 1846** (LAM). 5-10.

23. **Coreopsis** L.

1a. Fleshy thick-stemmed branching shrub 0.4-2 m tall — 3. **C. gigantea**
1b. Annuals
  2a. Outer phyllaries linear, obtuse; stems scapose or nearly so; pappus 2 mm long — 1. **C. bigelovii**
  2b. Outer phyllaries broadly ovate, acute; stems leafy below; pappus 4 mm long — 2. **C. calliopsidea**

1. **C. bigelovii** (A. Gray) Hall. Slender annual 1-6 dm tall; heads 2-4.5 cm across; flowers bright yellow. Rare in grassland and open southern oak woodland from Malibu Creek eastward, at relatively low elevations away from the coast. 3-4.

2. **C. calliopsidea** (DC.) A. Gray. Stout annual 1-6 dm tall; heads 2-9 cm across; flowers bright yellow. "Calabasas," fide Keck (in Munz 1959; p. 1098). Locality entirely disjunct for the species and to be regarded as doubtful.

3. **C. gigantea** (Kell.) Hall. Sea-Dahlia. Shrub with a fleshy, branched trunk up to 1.2 dm in diameter surmounted by dense tuft of leaves; heads 4-8 cm across; flowers bright yellow. The colonies of this species are a prominent feature of bluffs along the immediate coast from the vicinity of Point Dume westward. It also extends slightly inland along the west end of the mountains to the vicinity of Camarillo State Hospital. Outside of our area it is found on most of the Channel Islands and on Guadalupe Island and here and there along the coast north of San Luis Obispo County. 3-5.

24. **Corethrogyne** DC.

1. **C. filaginifolia** (H. & A.) Nutt. Suffrutescent or herbaceous perennial, branching from the base; leaves ca 2-6 cm long, more or less permanently tomentose; ray flowers violet; disk flowers yellow; pappus of numerous slender light brownish bristles. 5-11. Two varieties are recognized in our area.

Phyllaries white-tomentose near apex; entire plants white-tomentose at time of flowering — 1a. var. **latifolia**
Phyllaries glandular but not white-tomentose — 1b. var. **virgata**

1a. var. **latifolia** Hall. Coastal-facing slopes in the vicinity of Point Mugu. White-tomentose plants from Point Dume are similar but some lack the tomentum on the involucre.

1b. var. **virgata** (Benth.) A. Gray. Common throughout in coastal sage scrub and more rarely in other plant associations.

A complex very badly in need of detailed study; plants from 2700 ft elevation on the north side of Saddle Peak may be referrable to var. **peirsonii** Canby. A collection from Coldwater Canyon, **Peirson 1264** (RSA), is entirely thin-tomentose with very few glands. In several localities, such as on Saddle Peak, two distinct forms grow side-by-side, apparently without intergrading.

25. **Cotula** L.

1a. Slender annual; flowers greenish; heads 2-5 mm wide	1. **C. australis**
1b. Fleshy perennial; flowers bright yellow; heads 8-10 mm wide	2. **C. coronopifolia**

1. ***C. australis** (Sieber ex Spreng.) Hook. f. Low, spreading annual, sparsely pubescent; leaves 1-2 pinnate. Common weed at low elevations in fertile soil in east end of the mountains; rare elsewhere. Native of Australia. 1-4.

2. ***C. coronopifolia** L. Brass Buttons. Sprawling, glabrous, fleshy perennial; leaves entire to coarsely toothed. Locally common along streams and about wet places at low elevations; intermittent streambed, borders of coastal salt marsh; throughout. 3-12. Native to South Africa.

26. **Cynara** L.

1. ***C. cardunculus** L. Cardoon. A robust, heavily spined thistlelike perennial herb; flowers violet-purple. Native of Mediterranean region.

27. **Dimorphotheca** Vaill. Cape-Marigold

1. ***D. sinuata** DC. Annual, 10-30 cm tall, branching from base, glandular-pubescent throughout; leaves oblong-lanceolate, 2.5 cm wide, 9 cm long; heads 4 cm in diameter; rays orange-yellow. Weed along Decker Rd. N of Mulholland Hwy., **Koutnik & Dawes 493** (DAV). Native of South Africa.

28. **Encelia** Adans.

1. **E. californica** Nutt. Shrub, 0.6-1.5 m tall; stems puberulent, with white-pubescent patches in axils of the leaves; leaves lance-ovate, 3-6 cm long; ray flowers yellow; disk flowers purplish. A prominent and consistent member of coastal sage scrub throughout the mountains, spreading into disturbed areas, and approaching 2000 ft elevation on Saddle Peak. 3-6.

29. **Erigeron** L. Fleabane

1. **E. foliosus** Nutt. Very strongly rhizomatous perennial; involucre 4-7 mm high. 5-6. The following two varietes occur in our area.

Leaves narrowly lanceolate; blades more than 3 mm wide	1a. var. **foliosus**
Leaves filiform, involute; blades less than 1 mm wide	1b. var. **stenophyllus**

1a. var. **foliosus.** Occasional in openings in chaparral, coastal sage scrub, and southern oak woodland, sometimes on burns, from the vicinity of Seminole Hot Springs eastward; away from the coast but at relatively low elevations.

1b. var. **stenophyllus** (Nutt.) A. Gray. Occasional in habitats similar to those of the following, but less common; Stokes Canyon, near Laurel Canyon, Lake Sherwood, probably elsewhere. Grows near the preceeding in Stokes Canyon; their status should be investigated.

30. **Eriophyllum** Lag.

1. **E. confertiflorum** (DC.) A. Gray. Golden-Yarrow. Low shrub, to 0.5 m tall; leaves deeply 3-5 lobed, green above, persistently tomentose below; involucres 3-6 mm high; heads yellow; rays 2-5 mm long; pappus paleaceous, up to 1 mm long. Common in more or less open places; chaparral, coastal sage scrub away from the immediate coast, southern oak woodland; throughout. 1-7.

31. **Filago** L.

1. **F. californica** Nutt. White-pubescent annual to 3.5 dm tall, strict or well branched; inflorescences compound, glomerate, with numerous oblong bracts about as long as the heads; heads elongate, ca 2 mm in diameter. Occasional, often in burns; coastal sage scrub, chaparral; from Malibu Creek eastward at lower elevations.

32. **Galinsoga** Ruiz & Pav.

1. ***G. parviflora** Cav. Slender annual; leaves opposite, ovate, 2-5 cm long; rays flowers white; disk flowers yellow. Infrequent weed of waste places and about cultivation in West Los Angeles and Santa Monica. Native of the American tropics. 5-9.

33. **Gnaphalium** L. Cudweed; Everlasting

1a. Heads clustered at tips of the stems, usually surpassed by subtending leaves; annual 8. **G. palustre**
1b. Heads not so clustered; subtending leaves very reduced or absent
  2a. Leaves green, at least above, at maturity
    3a. Leaves densely white tomentose beneath at maturity
      4a. Leaves of midstem linear, shortly decurrent; phyllaries not shining, chalky-white 5. **G. leucocephalum**
      4b. Leaves of midstem lanceolate to oblanceolate, broadly auriculate; phyllaries lustrous, shining 2. **G. bicolor**
    3b. Leaves green on both surfaces at maturity
      5a. Inflorescences corymbose; phyllaries white; leaves oblanceolate 3. **G. californicum**
      5b. Inflorescences paniculate; phyllaries tinged with pink; leaves narrowly lanceolate 9. **G. ramosissimum**
  2b. Leaves white tomentose on both surfaces at maturity
    6a. Annuals or biennials 1.5-6 dm tall; heads with 150 or more flowers
      7a. Heads 3-3.5 mm long; phyllary tips almost hyaline, whitish faintly tinged with brown; corollas reddish at the tips 6. **G. luteo-album**
      7b. Heads 4-6 mm long; phyllary tips scarious, yellow or straw-colored; corollas yellow 4. **G. chilense**
    6b. Perennials up to 1 m tall; heads with 35-90 flowers
      8a. Leaves above base of plant not at all decurrent, the principal ones widely divergent, oblanceolate, acute 7. **G. microcephalum**
      8b. Leaves above base of plant short-decurrent, erect, narrowly lanceolate, acuminate 1. **G. beneolens**

1. **G. beneolens** Davids. Erect perennial to 1 m tall, densely white tomentose throughout; basal leaves and those of young shoots linear, acuminate; inflorescence corymbose; heads clustered, 5-6 mm long. Dry waste ground; West Los Angeles. 9.

2. **G. bicolor** Bioletti. Erect perennial to 1 m tall; inflorescence relatively short and dense, rounded; heads 5-6 mm long. Fairly common in coastal sage scrub and more or less disturbed areas throughout. 1-4.

3. **G. californicum** DC. Erect perennial to 8 dm tall; heads ca 6 mm high. Common in coastal sage scrub and open places in chaparral throughout; less frequent in southern oak woodland. 1-7.

4. **G. chilense** Spreng. Annual or biennial. Known only from Griffith Park, **Braunton 237** (DS). 4-5.

5. **G. leucocephalum** A. Gray. Erect perennial to 1 m tall; leaves slightly broadened at base; inflorescence corymbose; heads 6-8 mm long. Sandy bottoms of Calleguas Creek; intermittent streambed. 8-10.

6. ***G. luteo-album** L. Annual, branching from the base; branches decumbent; inflorescence corymbose, rather clustered; heads 3-3.5 mm long. Occasional throughout in weedy places and about the margins of lakes and streams; at relatively low elevations. Native of Europe. 4-10.

7. **G. microcephalum** Nutt. Erect biennial or short-lived perennial, branching, to 1 m tall; densely white tomentose throughout; basal leaves and those on young shoots oblanceolate, those elsewhere narrower; inflorescence cymose-paniculate; branches often widely spreading; heads clustered at the ends of the branches, 4.5-5 mm long. Occasional throughout in grassland, coastal sage scrub, open places in chaparral, and southern oak woodland. 7-10.

8. **G. palustre** Nutt. Annual, branching, to 3 dm tall; leaves alternate, usually spatulate; heads 3 mm long. Occasional, wet places about lakes and along streams from Topanga Canyon westward; 5-10.

9. **G. ramosissimum** Nutt. Erect biennial, to 1.5 m tall; heads ca 5 cm tall. Coastal sage scrub; vicinity of Point Dume. 7-9.

34. Grindelia Willd. Gum Plant

1. **G. robusta** Nutt. var. **robusta.** Erect perennial from a subligneous crown, stems 5-12 dm tall; entire plant more or less viscid; heads 3-5 cm wide, bright golden-yellow; rays 25-45, 8-15 mm long. Dry openings; chaparral, coastal sage scrub; throughout, from the coast to well over 2300 ft. 4-10.

35. Gutierrezia Lag. Matchweed

1. **G. californica** (DC.) T. & G. [**G. bracteata** Abrams]. Low shrub to 9 dm tall; leaves filiform, mostly 2-3 cm long; ray flowers 3-7, disk flowers 2-6, both golden-yellow; achenes 1-2 mm long, hairy; pappus 1-2 mm long. Rare, on grassy hillsides in coastal sage scrub; Westwood, Griffith Park. 7-10.

36. Haplopappus Cass.

1a. Ray present; leaves entire
  2a. Involucres 8-14 mm high, the phyllaries subequal in length; rays 8-15 mm long ..... 3. **H. linearifolius**
  2b. Involucres 5-7 mm high, the phyllaries in 3-5 series, unequal in length; rays 4-6 mm long
    3a. Outer phyllaries obtuse; achenes pubescent all over ..... 4. **H. palmeri**
    3b. Outer phyllaries sharp-pointed; achenes pubescent above ..... 2. **H. ericoides**
1b. Rays absent; leaves entire or toothed
  4a. Leaves entire, oblanceolate, coriaceous; heads 9-12 flowered ..... 1. **H. arborescens**
  4b. Leaves toothed; heads 15-30 flowered
    5a. Corollas narrow below, abruptly expanded upward; involucres 5-8 mm high; pappus dingy white ..... 6. **H. venetus**
    5b. Corollas not abruptly expanded upward; involucres 10-15 mm high; pappus red-brown. ..... 5. **H. squarrosus**

1. **H. arborescens** (A. Gray) Hall subsp. **parishii** (Greene) Moran. [**H. parishii** (Greene) Blake, **Ericameria arborescens** (A. Gray) Greene]. Erect resinous shrub 1-3 m tall; leaves 2-6 cm long, 3-19 mm wide, flat; heads in a compact cyme; involucres ca 5 mm high; phyllaries in 4 series; flowers yellow; pappus dingy white. Very rare; chaparral, coastal sage scrub; Mandeville Canyon, Griffith Park. 9-11.

2. **H. ericoides** (Less.) H. & A. subsp. **blakei** C. B. Wolf. [**Ericameria ericoides** (Less.) Jepson]. Erect shrub ca 1 m tall; Similar to No. 4; leaves mostly 4-12 mm long; flowers yellow; rays flowers 2-6. Locally common on sandy coastal flats, Point Dume. 9-11.

3. **H. linearifolius** DC. [**Ericameria linearifolia** (DC.) Urbatch & Wussow]. Erect shrub to 1.5 m tall; leaves nearly linear, 1-4 cm long, 1-2.5 mm wide; flowers yellow; rays 13-18; achenes silky-pilose; pappus white. Open rocky slopes near Cornell Corners. 3-5.

4. **H. palmeri** A. Gray subsp. **pachylepis** Hall. [**Ericameria palmeri** (A. Gray) Hall subsp. **pachylepis**]. Low shrub, mostly less than 1 m tall; leaves filiform, 1.5-4 cm long; flowers yellow; rays flowers 4-10; achenes silky-pubescent; pappus dingy white. Fairly common on open slopes and flats in southern oak woodland and coastal sage scrub, east end of the mountains and along the north edge of the west end, but not near the coast. 9-11.

5. **H. squarrosus** H. & A. subsp. **grindelioides** (DC.) Keck. [**Hazardia squarrosa** (H. & A.) Greene var. **grindelioides** (DC.) W. D. Clark.]. Subshrub, woody at base, to 1 m tall; leaves sharply serrate, 1.5-4 cm long, 1-2 cm wide; involucres turbinate, with strongly graduated bracts; flowers yellow; achenes glabrous or sparsely pubescent. Common in coastal sage scrub and chaparral nearly throughout, and extending to high elevations, but very rare along the immediate coast. 8-11.

6. **H. venetus** (H.B.K.) Blake. Shrub 0.3-1 m tall, somewhat woody below; leaves oblong, 1-4 cm long, 2-8 mm wide; involucre turbinate; flowers yellow; achenes silky pubescent. 6-11. Divisible in our area into the following subspecies:

Plants prostrate or nearly so; leaves nearly glabrous, rounded,
coriaceous 5a. subsp. **sedoides**
Plants more or less erect; leaves pubescent, grayish 5b. subsp. **vernonioides**

6a. subsp. **sedoides** (Greene) Munz. Frequent along the immediate coast; coastal strand; from Point Mugu to Pacific Palisades. The status of this subspecies and its relationship with subsp. **vernonioides** should be investigated.

6b. subsp. **vernonioides** (Nutt.) Hall. Common below 1500 ft throughout; coastal sage scrub, chaparral, southern oak woodland.

37. **Hedypnois** Schreb.

1. ***H. cretica** (L.) Willd. Low diffuse annual; ligules yellow with purple tip; pappus of outer achenes crownlike, that of inner achenes in 2 series of scales ca 2 mm long culminating in bristles ca. 5 mm long. Waste ground and along streams; vicinity of Saddle Rock. Native of the Mediterranean region. 3-6.

38. **Helenium** L. Sneezeweed

1. **H. puberulum** DC. Rosilla. Annual of biennial, to 1.5 m tall; leaves 3-15 cm long, 5-40 mm wide; stems decumbent, with wings decurrent from the bases of the petioles; disk brown, globose, 1-1.5 cm in diameter; rays reflexed, short, relatively inconspicuous. Shaded wet places along creeks, intermittent streambed; lower Malibu Creek, Los Angeles River. 6-10.

39. **Helianthus** L. Sunflower

1a. Outer phyllaries ovate, 4-6 mm wide; plants annual, sometimes persisting 1. **H. annuus**
1b. Outer phyllaries lanceolate, 2-3 mm wide; plants perennial, shrubby 2. **H. gracilentus**

1. **H. annuus** L. [including subsp. **lenticularis** (Dougl. ex Lindl.) Cockerell]. Common Sunflower. Stout annual, to 2 m tall, much branched; leaves ovate, harsh-pubescent, 6-15 cm long; ray flowers yellow; disk flowers brownish. Frequent throughout along roadsides and in disturbed areas. Perhaps introduced in our area. 2-10.

2. **H. gracilentus** A. Gray. Shrubby perennial, to 1.5 m tall; leaves lanceolate, harsh-pubescent, 3-12 cm long; ray flowers yellow; disk flowers brownish. Common on dry hillsides in and about chaparral, especially on recently burned areas, away from immediate coast and up to high elevations, from vicinity of Saddle Peak westward. 4-10.

40. **Hemizonia** DC. Tarweed

1a. Plants shrubby 2. **H. minthornii**
1b. Plants annual
  2a. Leaves tipped with a rigid spine; receptacular bracts free,
    surrounding each disk flower 3. **H. pungens**
  2b. Leaves not spine-tipped; receptacular bracts united into a cup 1. **H. fasciculata**

1. **H. fasciculata** (DC.) T. & G. [**H. ramosissima** Benth.]. Bushy annual, to 1 m tall; heads pedunculate; ray flowers 5, disk flowers 6, both golden yellow; anthers black; disk achenes sterile. In clay soil, especially where disturbed or in the open, throughout. 5-9.

2. **H. minthornii** Jeps. Shrub, 6-10 dm tall, flowers yellow. Rare in chaparral; Saddle Peak, Calabasas Peak, Castro Crest, Charmlee County Park; known elsewhere only in Simi Hills.

3. **H. pungens** (H. & A.) T. & G. Spikeweed. Well branched annual, to 1 m tall, spiny; flowers yellow; anthers yellow. Rare; wet sand along Los Angeles River; coastal sage scurb, Westwood (introduced?).

41. **Heterotheca** Cass. Telegraph Weed

1. **H. grandiflora** Nutt. Stout annual or biennial with erect stems to 2 m tall; leaves 2-7 cm long; involucre 7-9 mm high; flowers golden-yellow; pappus brick reddish. Common throughout, especially

along roads or in disturbed ground. 1-12.

42. **Hieracium** L. Hawkweed

1. **H. argutum** Nutt. subsp. **argutum**. Erect perennial herb, 3-10 dm tall, with basal rosette of leaves and reduced cauline leaves; leaves oblanceolate, dentate, villous; flowers yellow; achenes dark brown; pappus of capillary bristles, sordid. Rare; along east ridge of Castro Peak.

43. **Hypochoeris** L. Cat's-Ear

1a. Glabrous annual 1. **H. glabra**
1b. Pubescent perennial 2. **H. radicata**

1. ***H. glabra** L. Annual, 1-4 dm tall; involucre 10-16 mm high; flowers yellow; inner achenes beaked, outer ones truncate at summit. Occasional in grassland from Saddle Peak (2300 ft) and Point Dume eastward. Native of Europe, western Asia, and North Africa. 3-6.

2. ***H. radicata** L. Perennial herb, 1-8 dm tall; involucre 2-2.5 cm high; flowers yellow; achenes all with beaks. Rare weed in lawns; Santa Monica, Lake Sherwood. Native of Europe, North Africa, and western Asia. 6-7.

44. **Iva** L.

1. **I. axillaris** Pursh. Poverty Weed. Herbaceous or slightly woody, perennial, spreading from slender rhizomes; stems erect from a decumbent base, 2-6 dm tall; heads solitary in leaf axils. Dry, weedy flats near the entrance to Century Ranch.

45. **Jaumea** Pers.

1. **J. carnosa** (Less.) A. Gray. Glabrous, fleshy perennial with spreading, branching rhizomes; leaves entire, opposite, 2-4 cm long, 2-5 mm wide; involucres 8-12 mm high with broad phyllaries in 3-4 series; flowers yellow; pappus lacking. Locally common in damp soil; coastal salt marsh; vicinity of Point Dume; Point Mugu; remnants of Malibu Lagoon. 5-10.

46. **Lactuca** L. Lettuce

1. ***L. serriola** L. Prickly Lettuce. Coarse annual, beset with more or less dense prickles; leaves clasping; flowers yellow, often drying purple; achenes black, with 5-7 ribs on each face. Common in disturbed and waste ground throughout. Native of Eurasia and North Africa. 6-9.

47. **Lagophylla** Nutt.

1. **L. ramosissima** Nutt. Stiffly erect annual to 1 m tall; grayish-pubescent throughout; leaves subentire; densely white-pubescent about the heads; flowers yellow. Rare, hard clay soil of open fields; Triunfo Pass, 2100 ft; Triunfo Corner, 900 ft. 5-7.

48. **Lasthenia** Cass. Goldfield

1a. Herbage not glandular or viscid; leaves entire 1. **L. californica**
1b. Herbage glandular-viscid; leaves pinnately divided 2. **L. coronaria**

1. **L. californica** DC. ex Lindl. [**L. chrysostoma** (F. & M.) Greene, **Baeria chrysostoma** F. & M.]. Similar to No. 2 in general appearance. Occasional in grassland, usually in shallow soil, throughout. 3-4.

2. **L. coronaria** (Nutt.) Ornduff. [**Baeria californica** (Hook.) Chambers]. Slender annual to 2 dm tall; flowers golden yellow; rays 5-10 mm long; pappus variable or absent. Shallow soil over rocks in open grassland just west of Triunfo Pass, 2100 ft. 3-4.

49. **Layia** H. & A.

1. **L. platyglossa** (F. & M.) A. Gray. Tidy Tips. Erect annual to 3 dm tall; leaves bristly pubescent; lower leaves rounded-dentate; ligules 6-15 mm long, golden-yellow, often white near the tip; anthers black. Common on sandy coastal flats; Point Dume, Latigo Canyon, summit of Beverly Glen Canyon. 3-5.

50. **Lepidospartum** A. Gray

1. **L. squamatum** (A. Gray) A. Gray. Twiggy shrub with leaves on mature branches reduced to scales; involucre 4-6 mm high; flowers yellow. Occasional in coastal sage scrub and southern oak woodland at low elevations, mostly away from the immdediate coast but reaching it at Pacific Palisades, and extending from there eastward and westward on the north slope of the range. Often in washes and along streams in sandy soil. 8-11.

51. **Madia** Mol. Tarweed

1a. Disk flowers 15 or more; involucres 6-10 mm high
  2a. Ray flowers conspicuous, ligules 6-15 mm long; receptacle pubescent 1. **M. elegans**
  2b. Ray flowers inconspicuous, ligules short (rarely to 8 mm long); receptacle glabrous 3. **M. gracilis**
1b. Disk flower 1 (rarely 2); involucres 2.5-4.8 mm high 2. **M. exigua**

1. **M. elegans** D. Don ex Lindl. Perennial herb; stems commonly corymbosely branched above, 2-8 dm tall; flowers yellow, sometimes tinged maroon. Occasional along dry gravelly stream beds, northern slopes of western end of the range, below 2000 ft. 7-9.

2. **M. exigua** (Sm.) A. Gray. Perennial herb, stems corymbosely or paniculately branched, with subfiliform branches, 0.5-3 dm tall. Near a vernally moist depression, Saddle Peak, 2300 ft; Tuna Canyon. 5-6.

3. **M. gracilis** (Sm.) Keck. Gumweed. Perennial herb, 1-10 dm tall; stems simple or flexuously branched; branches not overtopping main stem; flowers yellow. Scattered in grassy openings 800-2600 ft; chaparral, southern oak woodland; from Topanga Canyon westward. 5-6.

52. **Malacothrix** DC.

1a. Slender annual; flowers yellow; 1 or 2 pappus setae 1. **M. clevelandii**
1b. Perennial; flowers white; all pappus setae deciduous 2. **M. saxatilis**

1. **M. clevelandii** A. Gray. Annual, 1-5 dm tall. Rare and scattered in open grassy spots as in southern oak woodland or on burns; low elevations away from the immediate coast. 4-6.

2. **M. saxatilis** (Nutt.) T. & G. var. **tenuifolia** (Nutt.) A. Gray. Suffrutescent perennial. Common throughout in all plant associations, but primarily in open or disturbed spots. 1-12.

53. **Matricaria** L.

1. **M. matricarioides** (Less.) Porter. Pineapple Weed. Erect, well-branched, aromatic annual 1-3 dm tall; leaves much dissected; disk greenish-yellow; involucres 5-7 mm high. Fairly common weed in more or less disturbed or open ground at low elevation throughout. 2-5.

55. **Micropus** L.

1. **M. californicus** F. & M. Floccose-woolly annual to 3.5 dm tall; leaves alternate, linear-oblong, 5-15 mm long; central flowers sterile, not subtended by bracts. Infrequent; scattered in shallow soil in chaparral or coastal sage scrub in the central and western portions of the mountains. 4-5.

54. **Microseris** D. Don

1a. Heads erect in bud, flower and fruit; pappus paleae easily deciduous, awn white	4. **M. linearifolia**
1b. Heads nodding in bud or later; pappus paleae not deciduous, awn brownish	
2a. Paleae more or less bifid at apex; plants caulescent or acaulescent; heads erect at maturity	3. **M. heterocarpa**
2b. Paleae entire at apex; heads nodding at maturity; acaulescent	
3a. Pappus paleae uniformly 5; achenes 1.5-3.5 mm long; awn nearly smooth	2. **M. elegans**
3b. Pappus paleae 2-5; achenes 3-10 mm long; awn barbellulate	1. **M. douglasii**

1. **M. douglasii** (DC.) Sch.-Bip. Annual; leaves strictly basal, 5-25 cm long; flowers yellow. 4-5. The following two subspecies are recognized in our area.

Pappus paleae averaging over 1 mm long	subsp. **douglasii**
Pappus paleae averaging 1 mm long or less	subsp. **tenella**

1a. subsp. **douglasii**. Has been collected a few times at low elevations in grassy fields.

1b. subsp. **tenella** (A. Gray) Chambers. Known from clayey grassland 3 miles east of Thousand Oaks, its southernmost locality; also reported from Malibu region (Munz, 1974).

2. **M. elegans** Greene ex A. Gray. Annual; leaves strictly basal; flowers yellow. Formerly collected near Santa Monica, but perhaps extirpated. 4-5.

3. **M. heterocarpa** (Nutt.) Chambers. Infrequent annual; flowers yellow. Throughout on grassy slopes or flats or in coastal sage scrub at lower elevations.

4. **M. linearifolia** (Nutt.) Sch.-Bip. [**M. lindleyi** of Munz]. Annual, sometimes caulescent; flowers yellow. Scattered in grassy openings at lower elevations away from the coast; throughout. 4-5.

56. **Monolopia** DC.

1. **M. lanceolata** Nutt. Annual, lanate above, glabours below, 1-6 dm tall; involucres 6-10 mm high; rays bright yellow, 1-2 cm long; pappus lacking. Grassy slopes in southern oak woodland, drainage of upper Malibu Creek. 3-4.

57. **Osteospermum** L.

1. **O. fruticosum** (L.) Norl. Trailing African Daisy. Trailing prostrate perennial to 3 dm tall; leaves obovate with remote teeth; flowers showy, rays generally white above and purple beneath. Commonly cultivated ground cover escaping along the coast; coastal strand. Native to South Africa.

58. **Pentachaeta** Nutt.

1. **P. lyonii** A. Gray [**Chaetopappa lyonii** (A. Gray) Keck]. Slender annual, 1-3 dm tall; leaves linear; involucre ca 5 mm high; phyllaries hirsute; flowers bright yellow; pappus of 10-12 slender fragile bristles. Rare; hills near lower Malibu Creek, Stunt Ranch to Saddle Rock. Otherwise known only from Wildwood Park, just north of our area, Palos Verdes Hills and Santa Catalina Island. 3-6.

59. **Perityle** Benth.

1. **P. emoryi** Torr. Annual or biennial to 4 dm tall, with brittle branches; leaves broadly cordate to ovate, 1-4 cm long, deeply toothed or palmately lobed; involucres 5-6 mm high; phyllaries in 2 series; ray flowers white; disk flowers yellow; pappus a crown of small scales with or without a single short awn. Occasional in clay soil on bluffs immediately above the ocean; along the entire coast; 3-10.

60. **Picris** L.

1. ***P. echioides** L. Bristly Ox-Tongue. Rank, well-branched annual or biennial to 1 m tall; entirely bristly hairy; leaves coarsely toothed, to 2 dm long; flowers yellow; achenes beaked. Common in more or less disturbed areas at lower elevations throughout. Native of the Mediterranean region. 1-12.

61. **Pluchea** Cass.

1. **P. odorata** (L.) Cass. var. **odorata**. [**P. purpurascens** (Sw.) DC.]. Marsh-Fleabane. Stout, strong-smelling, glandular-pubescent annual to perennial herb 5-12 dm tall; heads in a terminal corymobse cluster; flower purple. Rare in wet places; Los Angeles River, Medea Creek. 7-11.

62. **Psilocarphus** Nutt.

1. **P. tenellus** Nutt. var. **tenellus**. Prostrate annual, well branched from the base, with a woolly tomentum; leaves 4-15 m wide. Along streams and in formerly wet places, rare; upper Malibu Creek, Griffith Park. 4-5.

63. **Rafinesquia** Nutt.

1. **R. californica** Nutt. Ill-scented, subglabrous rank annual, to 1.5 m tall; leaves subentire to pinnatifid; flowers white, sometimes with a rose tinge. Occasional in shaded places, especially on burns, along the northern side of the western end of the mountains; ascending to more than 2000 ft on Saddle Peak. 4-6.

64. **Senecio** L. Groundsel, Ragwort

1a. Glabrous vine with thin round-cordate ivy-like leaves ... 5. **S. mikanioides**
1b. Herbs or shrubs; leaves not ivy-like
  2a. Perennials; rays conspicuous
    3a. Shrub; leaves and stems tomentose; leaf-segments linear; heads with conspicuous linear bracteoles at the base ... 4. **S. douglasii**
    3b. Perennial herb; leaves and stems glabrous; leaf-segments ovoid; heads with bracteoles inconspicuous or lacking ... 2. **S. breweri**
  2b. Annuals
    4a. Rays lacking or very inconspicuous
      5a. Phyllaries ca 21; rays lacking ... 6. **S. vulgaris**
      5b. Phyllaries ca 8; rays inconspicuous ... 1. **S. aphanactis**
    4b. Rays present, conspicuous, ca 1 cm long ... 3. **S. californicus**

1. **S. aphanactis** Greene. Annual, 1-2.5 dm tall; leaves sessile, coarsely toothed or pinnately lobed; involucre 5 mm high; flowers yellow; rays inconspicuous.

2. **S. breweri** Burtt.-Davy. Perennial from a short woody base, glabrous except for cottony tufts in the leaf-axils; leaves pinnatifid, clustered at the base, 1.5-3 dm long, reduced upward; involucre 7-10 mm high; flowers yellow; rays 8-15 mm long. Shaded slopes in southern oak woodland; upper drainage of Malibu Creek, 900 ft, the southern limit of this species. 4-5.

3. **S. californicus** DC. Annual, 1-3 dm tall; leaves clasping at base, coarsely toothed; involucre 5-7 mm high, lacking bracteoles; flowers yellow. Grassy places, Griffith Park. 2-3.

4. **S. douglasii** DC. subsp. **douglasii**. Shrub ca 1 m tall; herbage densely tomentose when young; involucre 8-10 mm high; flowers yellow; rays 1-1.5 cm long. Common throughout, away from the immediate coast mostly in coastal sage scrub. 6-11.

5. ***S. mikanioides** Otto. ex Walp. German-Ivy. Glabours perennial; heads yellow, in loose corymbose clusters. Locally established near gardens in canyon, east end of the range from Mandeville Canyon eastward. Native of South Africa. 12-2.

6. ***S. vulgaris** L. Common Groundsel. Annual; leaves coarsely pinnatifid; involucres 4.5-8 mm high; flowers yellow. Occasional weed of waste places at low elevations throughout. Native of Europe. 1-6.

65. **Silybum** Adans.

1. ***S. marianum** (L.) Gaertn. Milk-Thistle. Rank, spiny annual weed, to 2 m tall; leaves white mottled on upper surface; flowers purple; pappus shining white, in several series, not plumose. Common in weedy ground and about plantings at low elevations throughout. Native of Mediterranean region. 5-7.

66. **Solidago** L. Goldenrod

1a. Leaves spatulate to obovate, 1-3.5 cm wide, crenate or serrate, petiolate; heads in a narrow dense panicle; ray flowers 8-13 — 1. **S. californica**
1b. Leaves lance-linear, 3-9 mm wide, entire, sessile; heads in terminal cymose clusters; ray flowers 15-25 — 2. **S. occidentalis**

1. **S. californica** Nutt. Perennial, to 1 m tall, densely puberulent; leaves puberulent, 1-nerved, 5-12 cm long; flowers yellow. Scattered and rather infrequent in colonies on dry hillsides, often under oaks; throughout. 7-10.

2. **S. occidentalis** (Nutt.) T. & G. [**Euthamia occidentalis** Nutt.]. Rhizomatous perennial to 2 m tall, glabrous, often glutinous; leaves subglabrous, glandular-punctate, 3-5 nerved, 4-10 cm long; flowers yellow. Occasional in wet places at lower elevations in the western and central portions of the mountains; freshwater marsh. 8-11.

67. **Soliva** Ruiz & Pav.

1. ***S. daucifolia** Nutt. Low, spreading, pubescent annual; leaves much dissected. Rare weed in lawns, Westwood. Native of coastal California but doubtlessly introduced in our area.

68. **Sonchus** L.

1a. Basal auricles of leaf rounded; achenes striate but otherwise smooth — 1. **S. asper**
1b. Basal auricles of leaf pointed; achenes striate and coarsely rugose — 2. **S. oleraceus**

1. ***S. asper** (L.) Hill. Similar to No. 2, but the auricles of the clasping leaf bases rounded; leaves dark glossy green above. Occasional in western half of the mountains. Native to Eurasia and North Africa. 5-10.

2. ***S. oleraceus** L. Sow-Thistle. Rank annual with stout erect glabrous stems to over 1 m tall, hollow except at the nodes; leaves runcinate-pinnatifid, dull green, with leaf bases clasping with pointed auricles; heads 2-2.5 cm in diameter; flowers yellow. Common throughout at lower elevations in disturbed ground and about buildings and plantings. Native of Eurasia and North Africa. 1-12.

69. **Stephanomeria** Nutt.

1a. Plants perennial; leaves white-woolly; involucre 12-15 mm high; bracts strongly graduated in size — 1. **S. cichoriacea**
1b. Plants annual
  2a. Achenes grooved longitudinally
    3a. Pappus bristles not thickened at base, free, breaking off cleanly from achene — 2. **S. diegensis**
    3b. Pappus bristles at least slightly thickened, often connate in grooups of 2-4 at bases, breaking above bases which remain adnate to achene — 3. **S. exigua**
  2b. Achenes not grooved — 4. **S. virgata**

1. **S. cichoriacea** A. Gray. Woody-based perennial; receptacle covered with hairy pits; ligule pink. Open rocky hillsides in canyons away from the immdeiate coast at lower elevations, from Malibu Creek to Franklin Canyon. 8-10.

2. **S. diegensis** Gottlieb. Annual, intermediate to **S. exigua** and **S. virgata**; head solitary or clustered on short peduncles. Open pioneer sites below 2000 ft; Mandeville Canyon, Zuma Beach. 7-11.

3. **S. exigua** Nutt. subsp. **coronaria** (Greene) Gottlieb. Diffusely branced annual; glabrous to sparsely pubescent on stems and involucres; ligule white to pink above, purple-tinged below, very variable within populations in terms of ligule number, size and color. Sepulveda Canyon to Point Mugu. (n=8). 7-11.

4. **S. virgata** Benth. Erect widely branching annual to 2 m tall; receptacle lacking hairy pits; ligule white or pink above, purplish below. Common throughout in more or less disturbed places below 2000 ft. 7-11.

70. **Stylocline** Nutt.

1a. Receptacular bracts surrounding the marginal flowers, rigidly uncinate at apex, spreading in age ... 1. **S. filaginea**
1b. Receptacular bracts not uncinate, not spreading in age ... 2. **S. gnaphalioides**

1. **S. filaginea** (A. Gray) A. Gray. Wooly-canescent, branching annual, 3-10 cm tall, to 2 dm across. Open grassy flat in chaparral near Seminole Hot Springs. 4.

2. **S. gnaphalioides** Nutt. Slender, white-woolly, erect annual, mostly under 1 dm tall; heads globose, ca 4.5 mm in diameter. On shallow soil over rocks just west of Triunfo Pass, 2100 ft. 4.

71. **Taraxacum** L. Dandelion

1. ***T. officinale** Wiggens. Common Dandelion. Perennial herb; leaves runcinate-pinnatifid, basal, acrid in taste; flowers yellow. Common throughout about lawns and plantings and occasional elsewhere, as about lakes, at lower elevations. Native of Eurasia. 1-12.

72. **Tragopogon** L. Goat's-Beard

1. ***T. porrifolius** L. Oyster Plant; Salsify. Stout leafy perennial to 1.4 m tall; leaves entire, linear-lanceolate, grass-like, 1-3 dm long. Rare weed in waste ground near the coast from Point Dume to Santa Monica. Widely cultivated. Native of the Mediterranean region. 4-6.

73. **Venegasia** DC.

1. **V. carpesioides** DC. Coarse suffrutescent perennial, to 2.5 m tall, subglabrous; leaves thin, 5-15 cm long; involucres hemispheric, with broad phyllaries in 3-4 series; flowers yellow; pappus lacking. Frequent in canyons and on north-facing slopes throughout (not known from Griffith Park); becoming abundant on protected slopes after burns and then conspicuous by virtue of its pale green foliage and yellow flowers. 3-6.

74. **Verbesina** L.

1. ***V. encelioides** (Cav.) Benth. & Hook. f. ex A. Gray subsp. **exauriculata** (Robins. & Greenm.) J. R. Coleman. Annual, to 1 m tall; leaves densely white-pubescent beneath, the lower surface thus much paler than the upper; upper leaves alternate, coarsely toothed; flowers golden-yellow. Colonial in disturbed ground at low elevations along the west and north margins of the range. Native of the Great Plains. 5-10.

75. **Xanthium** L. Cocklebur

1a. Leaves lanceolate with conspicuous 3-forked spines in their axils ... 1. **X. spinosum**
1b. Leaves broadly ovate or cordate, lacking spines ... 2. **X. strumarium**

1. ***X. spinosum** L. Spiny Clotbur. Coarse annual to 1 m tall; leaves silvery-tomentose below, short-petiolate; spines 1-2.5 cm long, yellow; burs ca 1 cm long. Frequent in waste places and agricultural land at scattered localities throughout. Place of origin uncertain. 7-10.

2. **X. strumarium** L. Coarse annual, to 1.5 m tall; leaves harshly short-pubescent; petioles approximately equal in length to the blades; burs ca 3.5 cm long. Waste places and in moist fertile soil, as about lakes, throughout; intermittent streambed, freshwater marsh. Both var. **canadense** (Mill.) T. & G., with spines of the fruit hispid below, and var. **glabratum** (DC.) Cronq., with spines glabrous and glandular below, are present in our area. 7-10.

BATACEAE Saltwort Family

1. **Batis** (P. Br.) L.

1. **B. maritima** L. Saltwort. Sprawling, perennial, woody only at base; stems up to 1 m long; leaves fleshy, subterete, 1-2 cm long; flowers inconspicuous, in dense spikes. Locally common, low marsh, margins of tidal creeks and ponds; coastal salt marsh, Mugu Lagoon. 4-10.

BERBERIDACEAE Barberry Family

1. **Mahonia** Nutt. Barberry

1. **M. pinnata** (Lag.) Fedde. [**Berberis pinnata** Lag.]. Small evergreen shrub; leaves alternate, odd-pinnate; leaflets 5-11, glossy-green, sinuately spinulose-dentate; flowers yellow in drooping, fascicled racemes; fruit a blue-glaucous, few seeded berry. Uncommon, in deep shade; Seminole Hot Springs, Old Topanga Canyon, Boney Ridge. 3-6.

BETULACEAE Birch Family

1. **Alnus** Hill. Alder

1. **A. rhombifolia** Nutt. White Alder. Tree usually 10-20 m tall; bark smooth, gray or gray-brown; leaves elliptic, ca 6-8 cm long with prominent straight and parallel secondary veins. Along permanent streams in the central portion of the mountains below 1000 ft, riparian woodland. 2-3.

BORAGINACEAE Borage Family

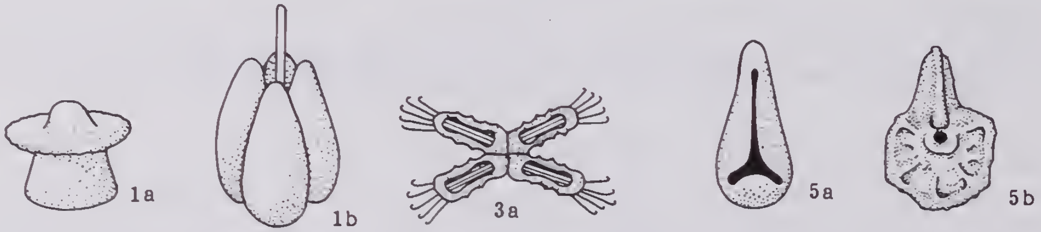

Figure 17. Characteristics of Boraginaceae referred to in key. Numbers refer to leg of key.

1a. Glabrous perennial, somewhat succulent; ovary not lobed; style attached at ovary apex; stigma discoid 3. **Heliotropium**
1b. Pubescent annual, not succulent; ovary deeply 4-lobed; style attached to gynobase between ovary lobes
  2a. Nutlets with prominent spines
    3a. Nutlets widely spreading at maturity; hooked spines at apex of nutlets 4. **Pectocarya**
    3b. Nutlets together and erect at maturity; spines with numerous recurved barbs on back of nutlets 5. **Plagiobothrys**
  2b. Nutlets without spines
    4a. Corollas yellow 1. **Amsinckia**
    4b. Corollas white
      5a. Inner surface of the nutlets with a longitudinal groove, forked at the base 2. **Cryptantha**
      5b. Inner surface of nutlet with a keel and a round or oval attachment-scar 5. **Plagiobothrys**

1. **Amsinckia** Lehm. Fiddle Neck

1a. Corollas golden-yellow, 7-20 mm long, much longer than the calyx; nutlets papillose, glabrous 1. **A. intermedia**
1b. Corollas pale yellow, 5-7 mm long, scarcely longer than the calyx; nutlets papillose and pubescent with small, stalked, glandular trichomes 2. **A. menziesii**

1. **A. intermedia** Fisch. & Mey. Common Fiddleneck. Erect, sparsely bristly annual, 2-8 dm tall. Scattered throughout on grassy hillsides and burns. 2-5.

2. **A. menziesii** (Lehm.) Nels. & Macbr. Erect annual, bristly hirsute and often finely strigose, 1-6 dm tall. Grassy hillsides in southern oak woodland, upper Decker Canyon. 3-4.

2. **Cryptantha** Lehm. ex Fisch. & Mey. Popcorn Flower

1a. Nutlets papillose
  2a. Corollas 0.5 mm in diameter; nutlets heteromorphic with axile ones larger and less papillose; mature calyx about 1 mm long 3. **C. micromeres**
  2b. Corollas 1-6 mm in diameter; nutlets homomorphic; mature calyx 2-5 mm long
    3a. Calyx much longer than mature nutlets; nutlets lanceolate; style at most scarcely longer than nutlets 2. **C. intermedia**
    3b. Calyx slightly longer than mature nutlets; nutlets ovate; style longer than nutlets 5. **C. muricata**
1b. Nutlets smooth
  4a. Style less than one half as long as the nutlets; calyx less than 2 mm long 4. **C. microstachys**
  4b. Style nearly as long as the nutlets; calyx more than 2 mm long 1. **C. clevelandii**

1. **C. clevelandii** Greene. Annual; corollas 1-3 mm in diameter, white. Occasional on coastal bluffs, in coastal sage scrub, and in chaparral, western half of the mountains. 3-6.

2. **C. intermedia** (A. Gray) Greene. Annual; corollas 3-6 mm in diameter, white. Frequent throughout in chaparral and coastal sage scrub, on coastal bluffs, and often common on burns. 2-6.

3. **C. micromeres** (A. Gray) Greene. Annual, often less than 2 dm tall; corolla white. Infrequent but scattered throughout on the inland slopes, usually on shallow soil in chaparral, sometimes on burns. 3-5.

4. **C. microstachys** (Greene ex A. Gray) Greene. Annual; corollas 0.5-1 mm in diameter, white. Scattered from Arroyo Sequit to Sepulveda Canyon, on shallow soil in chaparral and on burns. 4-5.

5. **C. muricata** (H. & A.) Nels. & Macbr. Annual; corollas 2-5 mm in diameter, white, fairly showy. Quite common throughout in coastal sage scrub and chaparral and on coastal bluffs, often on burns. 2-6.

3. **Heliotropium** L.

1. **H. curassavicum** L. var. **oculatum** (Heller) I. M. Johnst. Glaucous perennial; corollas white, yellow in throat, becoming purplish. Frequent along coast and in moist, generally slightly saline places, coastal salt marsh; throughout. 4-10.

4. **Pectocarya** DC. ex Meissn.

1a. Nutlet margin toothed with nearly distinct teeth 1. **P. linearis**
1b. Nutlet margin entire, often undulate 2. **P. penicillata**

1. **P. linearis** (Ruiz & Pav.) DC. var. **ferocula** I. M. Johnst. Annual, branches spreading; corollas about 1 mm in diameter; nutlets 2-3.5 mm long. Occasional shallow soil in grassland; Triunfo Pass, Boney Ridge, Westwood. 3-4.

2. **P. penicillata** (H. & A.) A. DC. Annual, branches spreading; corollas about 1 mm in diameter; nutlets 1.5-2.5 mm long. Rare, Vermont Canyon, Griffith Park, **J. T. Howell 3460** (RSA). 3-4.

5. **Plagiobothrys** Fisch. & Mey. Popcorn Flower

1a. Nutlets with numerous recurved barbs on back; leaves opposite, at least below — 1. **P. acanthocarpus**
1b. Nutlets without prominent spines; leaves all alternate
  2a. Calyx circumcissile in fruit; leaf margins and midrib stained purple; leafy bracts absent or only below the lower few flowers of the inflorescence — 3. **P. nothofulvus**
  2b. Calyx not circumscissile; leaves not stained purple; leafy bracts present throughout inflorescence — 2. **P. canescens**

1. **P. acanthocarpus** (Piper) I. M. Johnst. Erect or spreading annual; lower leaves linear to spatulate-linear, 2-6 cm long; mature calyx spreading, to 6 mm long; corolla scarcely longer than the calyx. Rare; Upper Zuma Canyon, near Mulholland Highway. 3-5.

2. **P. canescens** Benth. Annual, several decumbent stems from base. Rare and scattered on open grassy slopes from Malibu Creek eastward. 3-5.

3. **P. nothofulvus** (A. Gray) A. Gray. Erect annual, 2-5 dm tall. Rare on grassy hillsides in eastern half of mountains. 3-4.

BRASSICACEAE Mustard Family

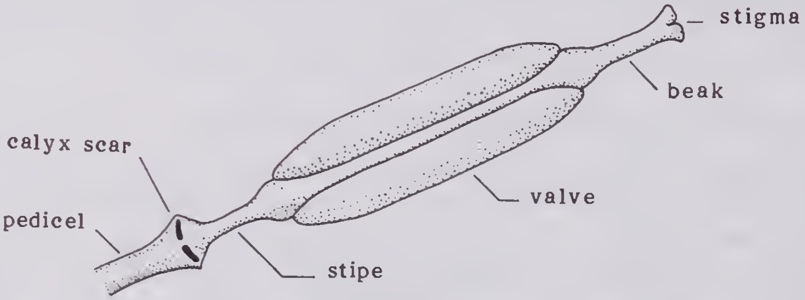

Figure 18. Fruit characteristics of Brassicaceae.

1a. Capsules oblong to linear, at least 2 times longer than wide (silique); composed of 3 parts: stipe, valves, and beak, often with one or two of these parts greatly reduced or lacking
  2a. Siliques on a stipe 1-2 cm long — 24. **Stanleya**
  2b. Siliques with a stipe less than 2 mm long or lacking
    3a. Plants glabrous; stems leafless below, erect, simple, from a deeply buried, ovoid rhizome; flowers showy; petals 9-13 mm long, white to pale pink; cauline leaves compound, usually trifoliolate; moist shaded slopes in southern oak woodland or dense chaparral — 7. **Cardamine**
    3b. Plants not as above
      4a. Siliques 3.5-6 mm thick, indehiscent; stipe and valves reduced
        5a. Siliques elongate, several seeded, with no projections at the junction of the valves and beak; weed in waste areas — 20. **Raphanus**
        5b. Siliques oblong or elliptic, 1 seeded, with pyramid shaped projections at junction of valves and beak; sandy ocean beaches — 5. **Cakile**
      4b. Siliques less than 3 mm thick, dehiscent by splitting of the two well-developed valves; beak lacking or if present less than 1/2 as long as valves
        6a. Pedicels reflexed; mature siliques pointed downward
          7a. Cauline leaves short petioled, cuneate at base, not auriculate — 9. **Caulanthus**
          7b. Cauline leaves sessile and auriculate at base

8a. Cauline leaves entire; leaves and stems densely pubescent with branched hairs — 1. **Arabis sparsiflora**

8b. Cauline leaves irregularly dentate to lobed; lower leaves sparsely pubescent with stiff, simple hairs — 25. **Streptanthus**

6b. Pedicels not reflexed; mature siliques erect or spreading at right angles to the stem

9a. Cauline leaves entire

10a. Cauline leaves auriculate at base; inflorescence glabrous; basal leaves pubescent with dendritic hairs — 1. **Arabis glabra**

10b. Cauline leaves cuneate at base; leaves, stems and inflorescence pubescent

11a. Petals yellow to orange; pubescence of hairs, attached at their middles — 14. **Erysimum**

11b. Petals white to magenta, not yellow; pubescence of dendritic hairs — 18. **Matthiola**

9b. Cauline leaves lobed, divided, or compound

12a. Siliques erect and appressed to the stem, less than 2 cm long

13a. Siliques with a beak sharply distinct from the valves; valves glabrous

14a. Valves of siliques with one prominent vein — 4. **Brassica**

14b. Valves of siliques with three veins, at least when young — 15. **Hirschfeldia**

13b. Siliques lacking a distinct beak; valves gradually narrowed into the nearly sessile stigma, usually pubescent — 23. **Sisymbrium**

12b. Siliques spreading, not appressed to the stem, of various lengths

15a. Siliques on a short but distinct stipe about 1 mm long — 12. **Diplotaxis**

15b. Siliques sessile

16a. Siliques flattened perpendicular to the septum that divides the silique into two valves — 26. **Tropidocarpum**

16b. Siliques terete, not flattened perpendicular to the septum

17a. Leaves deeply and finely pinnatisect, pubescent with dendritic hairs — 11. **Descurainia**

17b. Leaves coarsely lobed or compound, glabrous or pubescent with simple hairs

18a. Siliques 0.5-1.5 cm long; seeds in 2 rows in each valve; plants glabrous, growing along streams and lakes

19a. Petals yellow, 1-2 mm long; stems not rooting at the nodes — 21. **Rorippa**

19b. Petals white, 3-4 mm long; stems rooting at the nodes — 19. **Nasturtium**

18b. Siliques 2-10 cm long; seeds in 1 row in each valve; plants pubescent or glabrous

20a. Siliques with a beak at least 5 mm long which is sharply distinct from the valves

21a. Cauline leaves auriculate clasping, glaucous — 4. **Brassica**

21b. Cauline leaves not auriculate clasping, not glaucous — 22. **Sinapsis**

20b. Siliques lacking a distinct beak; valves gradually narrowed into the nearly sessile stigma

22a. Stems and lower leaves pubescent — 23. **Sisymbrium**
22b. Stems and lower leaves glabrous
23a. Pedicels 7-12 mm long, slender, only half as thick as the silique — 23. **Sisymbrium irio**
23b. Pedicels 3-4 mm long, nearly as thick as the silique — 3. **Barbarea**
1b. Capsules round or only slightly longer than wide (silicle)
24a. Silicles flat and not obviously divided into two parts
25a. Perennials; pedicels not recurved; silicles 2-celled, each cell with 1 seed; partition parallel to the flat surface of the silicle — 17. **Lobularia**
25b. Slender annuals; pedicels recurved; silicles 1-celled and 1-seeded
26a. Silicles with a circular wing, without hooked hairs; stems glabrous or with simple hairs — 27. **Thysanocarpus**
26b. Silicles not winged, bearing hooked hairs; stems with dendritic hairs — 2. **Athysanus**
24b. Silicles clearly divided into two parts, at least by a line from the base of the style to the pedicel on the flat side of the silicle
27a. Silicles divided into two nearly distinct halves and thus notched at both apex and base
28a. Silicles 7-12 mm wide; stems with stellate hairs — 13. **Dithyrea**
28b. Silicles about 2 mm wide; stems with simple hairs — 10. **Coronopus**
27b. Silicles not divided into two nearly distinct halves; never notched at both apex and base
29a. Silicles notched at apex; stigma sessile in this notch or on a very short style
30a. Silicles triangular with pointed base and broad apex — 6. **Capsella**
30b. Silicles circular with rounded base and rounded but notched apex — 16. **Lepidium**
29b. Silicles acute at apex; style ca 1 mm long and persistent — 8. **Cardaria**

1. **Arabis** L.

1a. Petals white; upper leaves and pedicels glabrous — 1. **A. glabra**
1b. Petals pink to purple; upper leaves and pedicels pubescent with dendritic hairs — 2. **A. sparsiflora**

1. **A. glabra** (L.) Bernh. Tower-Mustard. Annual or biennial; stems simple, 3-10 dm tall; basal leaves broadly oblanceolate, forming a rosette, petals yellowish-white. Occasional in southern oak woodland; Los Alisos Canyon to Laurel Canyon, below 2000 ft and on the seaward side of the mountains. 3-5.

2. **A. sparsiflora** Nutt. ex T. & G. var. **californica** Rollins. Perennial; stems simple, 4-10 dm tall; basal leaves linear-oblanceolate, not forming a rosette; petals pink or purple. Rocky openings in chaparral; Griffith Park. 2-4.

2. **Athysanus** Greene

1. **A. pusillus** (Hook.) Greene. Slender annual, simple or branched near the base, 1-3 dm tall; flowers 1 mm long; silicles 2 mm long. Thin soil in grassy openings in chaparral; Triunfo Pass, upper Malibu Creek area. 3-5.

3. **Barbarea** Scop. Winter-Cress

1. **B. orthoceras** Ledeb. Biennial; basal leaves simple or with 1 or 2 pairs of lateral leaflets, the terminal one orbicular; petioles 2-6 cm long; flowers pale-yellow. Occasional in moist places above 1000 ft; chaparral; western end of the range. 4-6.

4. **Brassica** L. Mustard

1a. Siliques appressed to the stem; leaves subtending branches of the inflorescence narrow 1. **B. nigra**
1b. Siliques spreading, not appressed; leaves subtending branches of the inflorescence broad 4. **B. rapa**

1. ***B. nigra** (L.) Koch. Black Mustard. Annual; petals yellow; mature siliques, including beak, 12-20 mm long; beak usually without a seed. Occasional at low elevations, in waste places or seeded on burns, throughout. 3-7. The seasoning black mustard is made from the seeds. The original range of the species is unknown, but it is a native of the Old World.

2. ***B. rapa** L. subsp. **sylvestris** (L.) Janchen [**B. campestris** L.]. Common Mustard. Annual or biennial; petals yellow; mature silique, including beak, 4-6 cm long. Along the coast and in the eastern half of the mountains. 1-12. Europe.

5. **Cakile** Mill. Sea-Rocket

1. ***C. maritima** Scop. Glabrous, succulent annual; petals pink to purple. Ocean Beach, Point Mugu to Point Dume. 3-10. Native of Europe and N. Africa to Iran.

6. **Capsella** Medic. Shepherd's-Purse

1. ***C. bursa-pastoris** (L.) Medic. Annual, 1-5 dm tall; flowers 1-2 mm long, petals white. Waste areas and disturbed places in chaparral and southern oak woodland; Triunfo Canyon eastward, below 2000 ft and away from the ocean. 1-12. Cosmopolitan weed probably originally of the Mediterranean region.

7. **Cardamine** L.

1a. Basal leaves from a thickened horizontal rhizome; petals 9-14 mm long 1. **C. californica**
1b. Basal leaves forming a basal rosette; petals ca 2 mm long 2. **C. oligosperma**

1. **C. californica** (Nutt.) Greene. [**Dentaria californica** Nutt.]. Glabrous perennial; leaves mostly 3-foliolate; petals rose to white. Moist, shaded banks in southern oak woodland and chaparral; Triunfo Canyon to Sepulveda Canyon, away from the ocean and below 2000 ft. 2-4.

2. **C. oligosperma** Nutt. Annual or biennial; leaves 5- to 11-foliolate; petals white. Decker Rd near Mulholland Hwy.

8. **Cardaria** Desv.

1a. Siliques glabrous, broader than long, notched at base 1. **C. draba**
1b. Siliques pubescent, longer than broad, not notched at base 2. **C. pubescens**

1. ***C. draba** (L.) Desv. Hoary-Cress. Perennial herb, 3-6 dm tall; largest cauline leaves 4-7 cm long, 2.5-3.5 cm wide, lower leaves petioled, upper sessile, auriculate; petals white, 2-3 mm long. Rare but locally abundant in meadow near Seminole Hot Springs. 3-6. Mediterranean region and western Asia.

2. ***C. pubescens** (C. A. Mey.) Roll. var. **elongata** Roll. Whitetop. Minutely pubescent perennial, 1-4 dm tall; leaves 1-3.5 cm long; petals white. Probably native to Asia.

9. **Caulanthus** S. Wats.

1. **C. lasiophyllus** (H. & A.) Payson var. **lasiophyllus.** [**Thelypodium lasiophyllum** (H. & A.) Greene var. **lasiophyllum**]. Annual 2-12 dm tall; petals pale yellow, 4-6 mm long. Throughout the mountains, dry stream beds, southern oak woodland, chaparral, coastal sage scrub, burns. 4-6.

10. **Coronopus** Gaertn. Wart-Cress

1. ***C. didymus** (L.) Sm. Annual or biennial; branches prostrate or ascending; flowers very small, greenish white. A weed in gardens, waste places; Santa Monica to Griffith Park. 2-5. S. America.

11. **Descurainia** Webb. & Berthel. Tansy-Mustard

1a. Mature siliques clavate, 7-12 mm long, 1.5-2 mm wide **1. D. pinnata**
1b. Mature siliques linear, 15-25 mm long, less than 1 mm wide **2. D. sophia**

1. **D. pinnata** (Walt.) Britt. subsp. **menziesii** (DC.) Detl. Annual 1-7 dm tall; petals yellow. Sepulveda Canyon. 3-6.

2. ***D. sophia** (L.) Webb. ex Prantl. Annual, 2-6 dm tall; petals greenish-yellow. Southern oak woodland. Triunfo Canyon. 4-8 Native of Eurasia.

12. **Diplotaxis** DC.

1. ***D. tenuifolia** (L.) DC. Wall-Rocket. Perennial herb; leaves fetid when crushed; petals 8-15 mm long, twice as long as the sepals. Rare weed, waste ground; Santa Monica, Elysian Park. 3-9. Europe.

13. **Dithyrea** Harv. Spectacle-Pod

1. **D. maritima** A. Davids. Perennial, often flowering the first year, 1-3 dm tall; leaves suborbicular, entire to sinuate; petals white. Sand dunes along the coast, Santa Monica. Probably extirpated in our area.

14. **Erysimum** L. Wallflower

1a. Plants biennial, simple, not suffrutescent; petals orange to dark yellow; away from the coast **1. E. capitatum**
1b. Plants suffrutescent; petals yellow; along immediate coast **2. E. suffrutescens**

1. **E. capitatum** (Dougl.) Greene. Plants simple, erect, 2-8 dm tall; petals orange. Openings in chaparral below 2000 ft. Malibu Creek drainage. 3-5.

2. **E. suffrutescens** (Abrams) G. Rossb. Plants with several erect stems, 3-6 dm tall, from a simple base; petals bright yellow. Rare, Point Mugu. 3-5.

15. **Hirschfeldia** Moench.

1. ***H. incana** (L.) Lagreze-Fossat. [**Brassica geniculata** (Desf.) J. Ball. Annual to perennial; petals light yellow; mature silique, including beak, 8-15 mm long; beak usually with one seed, valve of the silique with a central, longitudinal vein and only slightly weaker lateral veins, hence 3-7 veined. Throughout. (2) 3-9. Native of Mediterranean and Near East.

16. **Lepidium** L. Peppergrass

1a. Silicles with two acute wings at apex; notch between wings narrow and ca 2 mm deep; inflorescence congested **3. L. latipes**
1b. Silicles rounded at apex, not winged but with a notch less than 1 mm deep; inflorescence not congested
  2a. Pedicels rounded; silicles 2-3 mm long
    3a. Cauline leaves 1-4 cm wide; stamens 6 **2. L. latifolium**
    3b. Cauline leaves less than 1 cm wide; stamens 2
      4a. Sepals persising until fruit almost mature; cauline leaves pinnatifid to lacinately lobed **5. L. oblongum**
      4b. Sepals deciduous; cauline leaves entire to incised **6. L. virginicum**
  2b. Pedicels strongly flattened; silicles 3.5-4 mm long
    5a. Silicles glabrous **4. L. nitidum**
    5b. Silicles pubescent **1. L. lasiocarpum**

1. **L. lasiocarpum** Nutt. Annual. Saline soils at Playa del Rey and to be expected along the coastal portion of our area. 3-4.

2. ***L. latifolium** L. Perennial, 4-10 dm tall; pedicels 3-4 mm long, terete; silicles round-ovate,

ca 2 mm long, somewhat pilose. Locally abundant weed in low areas along Malibu Creek, Malibu Creek State Park. 4-5. Native of Europe.

3. **L. latipes** Hook. Low, spreading annual; pedicels short, 2-3 mm long in fruit, strongly flattened; petals greenish; silicles ca 6 mm long, glabrous or pubescent. Rare, flats near Santa Monica, March 1891, **Hasse** (DS). 3.

4. **L. nitidum** Nutt. Annual, 1-4 cm tall, erect, simple or with a few branches at base; silicles shining; fruiting pedicels 3-4 mm long. On shallow soil in grassland, coastal sage scrub, or on rocky openings in chaparral. Occasional throughout. 1-5.

5. ***L. oblongum** Small. Annual, hirtellous to villous; leaves pinnatifid to lacinately lobed; petals none or minute. Sandy areas, under oaks; Malibu Creek, Tapia Park. Apparently native to S. America.

6. ***L. virginicum** L. var. **pubescens** (Greene) C. L. Hitchc. Annual, 1-5 cm tall; petals white; fruiting pedicels 3-4 mm long. On burns and open ground in chaparral and disturbed places below 2000 ft. Occacional throughout. 5-7. Native of the eastern United States.

17. **Lobularia** Desv. Sweet-Alyssum

1. ***L. maritima** (L.) Desv. Decumbent annual or perennial herb; leaves linear-lanceolate, entire; petals white. Disturbed areas throughout. 2-10. Mediterranean region.

18. **Matthiola** R. Br. Stock

1. ***M. incana** (L.) R. Br. Annual to perennial; stems and leaves gray with branched hairs; petals ca 25 mm long, purple or red to white. A garden escape found in sandy areas along the coast. 3-5. Native of southern Europe, N. Africa to Asia Minor.

19. **Nasturtium** R. Br.

1. ***N. officinale** R. Br. in Ait. [**Rorippa nasturtium-aquaticum** (L.) Hayek]. Water-Cress. Herbaceous perennial with prostrate stems. Aquatic or growing in wet places along streams and lakes throughout the area. 5-10. Native of Europe and N. Africa.

20. **Raphanus** L.

1a. Fruit markedly constricted between seeds and breaking into 1-seeded joints; beak slender 1. **R. raphinastrum**
1b. Fruit not markedly constricted between seeds and not breaking into 1 seeded joints; beak long conical 2. **R. sativus**

1. ***R. raphinastrum** L. Jointed Charlock. Annual, 20-60 cm tall; petals white or yellow with violet veins. Serrano Valley. 3-5. Native to Europe.

2. ***R. sativus** L. Wild Radish. Annual or biennial; petals white, lilac or violet or sometimes yellow. Waste places, coastal areas and eastern half of the mountains. 3-5. Native range unknown.

21. **Rorippa** Scopp.

1. **R. curvisiliqua** (Hook.) Bessey ex Britt. Persistant annual, 1-3 dm tall. Wet places; Los Angeles River, Lake Sherwood, Malibu Creek. 4-9.

22. **Sinapsis** L.

1. ***S. arvensis** L. [**Brassica kaber** (DC.) Wheeler]. Annual; mature silique, including beak, 2-4.5 cm long. Frequent along the coast and occasional inland. 3-10. Native of Eurasia.

23. **Sisymbrium** L.

1a. Siliques erect and appressed to the axis of the inflorescence 3. **S. officinale**
1b. Siliques not appressed to the axis of the inflorescence
  2a. Uppermost leaves pinnately divided into filiform segments 1. **S. altissimum**
  2b. Uppermost leaves entire or hastate, not pinnately divided into filiform segments
    3a. Siliques 2-5 cm long, usually glabrous; pedicels 7-12 mm long, narrower than the siliques 2. **S. irio**
    3b. Siliques 5-10 cm long, hairy when young; pedicels 3-5 mm long, as wide as the siliques 4. **S. orientale**

1. ***S. altissimum** L. Tumble-Mustard. Annual; pedicels nearly as thick as the silique; flowers yellowish-white. In burned chaparral, Triunfo Pass, elevation 2100 ft. 5-7. Eastern Europe and the Near East.

2. ***S. irio** L. London-Rocket. Annual; petals yellow; seeds apparent through the thin wall of the silique. Disturbed places; Point Mugu, Mandeville Canyon, Santa Monica. 3-10.

3. ***S. officinale** (L.) Scop. Hedge-Mustard. Slender, erect annual, basal leaves in a rosette; petals yellowish. Occasional, southern oak woodland, chaparral and ocean beach. Central and western portions of the range. 4-7.

4. ***S. orientale** L. Annual; petals yellow. Waste areas, at low elevations throughout. 4-6. Southern Europe, N. Africa to the Near East.

24. **Stanleya** Nutt. Prince's Plume

1. **S. pinnata** (Pursh) Britt. Suffrutescent, 5-10 dm tall; petals yellow, 13-15 mm long. Rare, on road cuts facing ocean in coastal sage scrub near Malibu Lagoon. 1-12.

25. **Streptanthus** Nutt.

1. **S. heterophyllus** Nutt. Annual; stems simple, 3-8 dm tall; petals white with purple veins, 9-12 mm long. Openings in chaparral, burns, below 2000 ft, Los Alisos Canyon and upper Malibu Creek. 3-4.

26. **Tropidocarpum** Hook.

1. **T. gracile** Hook. Annual 1-4 dm tall, stems sometimes decumbent; petals yellow; siliques usually pubescent with short, stiff, reflexed hairs. Grassy meadows; Seminole Hot Springs, Las Trancas Canyon, Carbon Canyon. 3-4.

27. **Thysanocarpus** Hook. Lace-Pod; Fringe-Pod

1a. Cauline leaves auriculate-clasping; lower leaves hirsute, oblanceolate or lanceolate, shallowly dentate to nearly entire, in basale rosettes; center of silicles densely pubescent, the hairs overlapping 1. **T. curvipes**
1b. Cauline leaves scarcely or not at all auricled, lower leaves glabrous or very sparsely hirsute, linear and entire to deeply dentate or with a few long, narrow lobes, not in basal rosettes; silicles glabrous or sparsely pubescent with non-overlapping hairs 2. **T. laciniatus**

1. **T. curvipes** Hook. Annual, 1-4 dm tall; petals ca 2 mm long; silicles 4.5-7.5 mm long. Open, rocky areas in chaparral; Boney Ridge, Saddle Peak, Sepulveda Canyon. 2-4.

2. **T. laciniatus** Nutt. ex T. & G. Annual, 1-4 dm tall; petals ca 2 mm long; silicles 3-6 mm long. Thin soil in rocky areas in southern oak woodland and chaparral. Throughout the mountains below 2000 ft and generally away from the coast. 3-5.

BUDDLEJACEAE

1. **Buddleja** L.

1a. Leaves more than 5 cm long; petals lavender	1. B. **davidii**
1b. Leaves less than 5 cm long; petals cream-colored	2. **B. saligna**

1. ***B. davidii** Franch. Shrubs; leaves lanceolate, flat, serrulate at margin; flowers tubular, in panicle like clusters forming an elongated, narrow inflorescence. Occasional escape from cultivation; Malibu Creek (along coast). 6-7.

2. ***B. saligna** Willd. [**Chilianthus oleaceus** Burch.]. Large shrub 3-4 m tall; leaves narrowly lanceolate to oblanceolate, entire and revolute at margins; flowers small, in highly branched expanding panicles. Disturbed areas and roadsides in chaparral. Established at one site near Saddle Peak, its mode of introduction unknown. 6-10. Native of southern Africa.

CACTACEAE Cactus Family

1. **Opuntia** Mill. Prickly-Pear

1a. Joints of stem flattened, not tuberculate	
2a. Plants treelike, 3-7 m tall	1. **O. ficus indica**
2b. Plants erect or sprawling but not treelike, less than 3 m tall	
3a. Joints about as long or slightly longer than broad; spines yellow	3. **O. oricola**
3b. Joints about twice as long as broad; spines white	2. **O. littoralis**
1b. Joints of stem cylindrical, tuberculate	4. **O. prolifera**

1. ***O. ficus-indica** (L.) Miller. Treelike, 3-5 m tall; joints 3-6 dm long, 2-4 dm wide; spines none to many; flowers yellow or orange; fruits yellow or orange. Escape from cultivation. Native to tropical America. Hybridizes with native species.

2. **O. littoralis** (Engelm.) Ckll. var. **littoralis.** Coastal Prickly-Pear. Plants prostrate to somewhat ascending, spreading to form large masses; fruits obpyriform with elongated base; umbilicus flat; style pink. In coastal sage scrub along the immediate coast and inland to Griffith Park and sometimes growing with **O. oricola** as at Malibu. 5-6.

3. **O. oricola** Philbrick. [**O. occidentalis** as to coastal plants]. Plants ascending to erect, spreading to form large masses; fruits subspherical; umbilicus deeply depressed; style red. Temescal Canyon westward; in the coastal portion of the range usually in coastal sage scrub and sometimes growing with **O. littoralis** as at Malibu. 5-6.

4. **O. prolifera** Engelm. Plants erect, 1-2 m tall, with many spreading branches; joints easily detached; fruits fleshy, spineless or nearly so; flowers light rose to red-purple. Low ridges in salt marsh at Point Mugu; slopes, Conejo Mountain. 4-6.

CALLITRICHACEAE Water-Starwort Family

1. **Callitriche** L.

1. **C. marginata** Torr. Herbs with slender, tufted stems; leaves opposite, spatulate, to 8 mm long and 2 mm wide; flowers small, axillary; perianth none; stamen 1; fruit nut-like, 4-lobed, wider than long. Drying mud of vernal pools, rare; Soldier's Home, Santa Monica, **Hasse**.

CAMPANULACEAE Bluebell Family

1a. Corolla regular; anthers and filaments free	1. Githopsis
1b. Corolla irregular; anthers free or united; filaments united into a tube	
2a. Anthers united; perennial	2. **Lobelia**
2b. Anthers free; small annual	3. **Nemacladus**

1. **Githopsis** Nutt.

1. **G. diffusa** A. Gray. Small annual; stems slender, simple or few branched; leaves inconspicuous, narrowly obovate, serrulate; flowers few, scattered in upper axils; corolla light purple; capsules clavate, opening by a terminal perforation. Very rare and not recently collected. Shaded banks, Sawtelle. 4-6.

2. **Lobelia** L.

1. **L. dunnii** Greene var. **serrata** (A. Gray) McVaugh. Perennial; stems to 5 dm tall; leaves linear-lanceolate to oblanceolate, glabrous, serrate, sessile, the lower ones petioled; inflorescence a short terminal raceme; corolla blue with a whitish tube split from near the base about half way up; anthers blue, with a tuft of hairs at the tips. Shady canyons near water. Uncommon. Trancas Canyon. 7-9.

3. **Nemacladus** Nutt.

1. **N. ramosissimus** Nutt. Small, diffusely branched annual with numerous slender branches; cauline leaves minute, sessile; flowers white, minute, on long capillary pedicels which spread nearly horizontally but curve upward near the apex; seeds almost spherical with rounded pits. Dry sandy places under shrubs. Rare; Cornell Corners. 4-5.

CAPPARACEAE

1. **Cleome** L.

1. **C. isomeris** Greene. [**Isomeris arborea** Nutt.]. Shrub 1-2 m tall; leaves trifoliolate, ill-scented; petals yellow, ca 1 cm long; filaments 2 cm long; pods inflated, ca 1.5 cm wide and 4 cm long, on a stipe ca 2 cm long. Coastal sage scrub; along the immediate coast. 1-12.

CAPRIFOLIACEAE Honeysuckle Family

1a. Leaves odd-pinnate; large shrub or small tree; corolla rotate 5 mm across	2. **Sambucus**
1b. Leaves simple, the lower ones somtimes lobed; vine or small shrub; corolla tubular or campanulate	
2a. Corolla campanulate, 3-4 mm long, nearly regular; berry white; flowers in axillary, nearly sessile clusters	3. **Symphoricarpos**
2b. Corolla tubular, 1-2 mm long, bilabiate; berry red; flowers in axillary or terminal spikes or clusters on long peduncles	1. **Lonicera**

1. **Lonicera** L. Honeysuckle

1a. Upper leaf pair connate	1. **L. hispidula**
1b. Upper leaf pair not connate	2. **L. subspicata**

1. **L. hispidula** (Lindl.) Dougl. ex T. & G. var. **vacillans** (Benth.) A. Gray. Shrubs; stems trailing or climbing; leaves ovate, the largest 4-6 cm long; corolla ca 2 cm long, reddish purple without, yellow or white within. Dense chaparral in bottom of deep canyons, Malibu Canyon south of Tapia Park. 5-6.

2. **L. subspicata** H. & A. var. **johnstonii** Keck. Straggling shrub; leaves oblong to circular; 1.5-2.5 cm long; corolla yellow. Chaparral throughout the area. 4-5.

2. **Sambucus** L. Elderberry

1. **S. mexicana** Presl. ex DC. Large shrub or small trees mostly 3-10 m tall; inflorescence a flat-topped cyme; flowers creamy-white; berries black, very glaucous. Chaparral and open washes on deep soils. Throughout the mountains. 4-8.

3. **Symphoricarpos** Duhamel. Snowberry

1. **S. mollis** Nutt. Weak, spreading shrub, ca 0.5 m tall; corolla pink. Chaparral, southern oak woodland or riparian woodland; throughout. 4-5.

CARYOPHYLLACEAE Pink Family

1a. Fruit a 1-seeded utricle; petals absent
  2a. Matted seashore perennial densely invested; leaves needle-like; stipules translucent, white, conspicuous — 2. **Cardionema**
  2b. Annual; leaves flat oblanceolate, 3-7 mm long; stipules minute — 4. **Herniaria**
1b. Fruit a several to many seeded capsule; petals usually present
  3a. Calyx tubular, the sepals united nearly to their summit — 6. **Silene**
  3b. Calyx not tubular, the sepals free
    4a. Leaves subverticillate; capsules 5-valvate; annual — 7. **Spergula**
    4b. Leaves not subverticillate
      5a. Scarious stipules present
        6a. Fleshy plants; leaves subterete; petals conspicuous; styles 3-5 — 8. **Spergularia**
        6b. Diffuse annuals; leaves flattened; petals shorter than sepals, inconpsicuous; style 1 — 5. **Polycarpon**
      5b. Stipule absent
        7a. Stems and leaves conspicuously pubescent; capsules elongate-cylindric — 3. **Cerastium**
        7b. Stems and leaves glabrous or with a few fine hairs; capsules ovoid or ellipsoid
          8a. Petals subentire, present — 1. **Arenaria**
          8b. Petals very deeply bifid or absent — 9. **Stellaria**

1. **Arenaria** L.

1. **A. douglasii** Fenzl ex T. & G. [**Minuartia douglasii** (Fenzl ex T. & G.) Mattf.]. Slender, erect glabrous annual; leaves needle-like, 5-15 mm long; petals white, conspicuous, longer than the sepals; styles 3, opposite the outer sepals. Shallow soil in grassland; Triunfo Pass, 2100 ft. 4.

2. **Cardionema** DC.

1. **C. ramosissimum** (Weinm.) Nels. & Macbr. Matted woolly-stemmed perennial of the seacoast; Point Dume, common. 4-8.

3. **Cerastium** L.

1. ***C. glomeratum** Thuill. [**C. viscosum** auct. non L.]. Mouse-Ear Chickweed. Erect annual, mostly ca 1 dm tall; inflorescence a crowded cyme; petals bifid. Rare weed of waste places or by reservoirs throughout, at low elevations. 3-5. Native of Eurasia.

4. **Herniaria** L.

1. ***H. cinerea** DC. Matted annual up to 2 dm across; hispidulous throughout. Disturbed slopes under chaparral; Triunfo Pass, 2100 ft. 5-6. Native of the Mediterranean region.

5. **Polycarpon** L.

1a. Sepals 0.8-1 mm long, slightly keeled; capsule globose; leaves oblong — 1. **P. depressum**
1b. Sepals ca 1.5 mm long, sharply keeled; capsule ovoid; leaves obovoid — 2. **P. tetraphyllum**

1. **P. depressum** Nutt. Annual; stems to 0.5 dm long, often numerous and matted from the base. Scattered on open, often disturbed slopes in coastal sage scrub, and in weedy ground at low elevations from Topanga Canyon eastward. 4-6.

2. ***P. tetraphyllum** (L.) L. Annual; stems to 1 dm long, mostly few-branched from the base. Disturbed soil in coastal sage scrub, with **P. depressum**, lower Topanga Canyon; weedy ground, Santa Monica. 5. Native of Europe.

6. **Silene** L.

1a. Perennials; calyx 10-20 mm long
  2a. Corollas 8-15 mm long, scarlet; calyx 15-20 mm long — 3. **S. laciniate**
  2b. Corollas 4-6 mm long, greenish white to rose; calyx 10-12 mm long — 5. **S. verecunda**
1b. Annuals; calyx 5-10 mm long
  3a. Plants subglabrous; upper internodes usually with conspicuous reddish brown sticky bands — 1. **S. antirrhina**
  3b. Plants conspicuously pubescent
    4a. Calyx with about 25 conspicuous ribs — 4. **S. multinerva**
    4b. Calyx with 10 conspicuous ribs — 2. **S. gallica**

1. **S. antirrhina** L. Erect annual; calyx 10-nerved. Rare, in disturbed soil; Las Virgenes Canyon, Los Alisos Canyon, canyons above Santa Monica. 4-5. Perhaps not native in our area.

2. ***S. gallica** L. Erect annual; basal leaves narrowly spatulate. Frequent in disturbed and weedy ground throughout. 2-5. Native of Europe.

3. **S. laciniata** Cav. subsp. **major** Hitch. & Maguire. Glandular-pubescent perennial; stems rising in clusters from a deep taproot; blades of the petals 8-15 mm long. Commmon in coastal sage scrub and clearings in chaparral throughout, but not on the immediate coast and rare or absent on the northern side east of Malibu Canyon. 4-7.

4. **S. multinervia** S. Wats. Erect annual; viscid glandular. On burns and in disturbed soil, rare; Las Virgenes Canyon, Los Alisos Canyon, canyons above Santa Monica. 4-5.

5. **S. verecunda** S. Wats. subsp. **platyota** (S. Wats.) Hitch. & Maguire. Perennial 1-3 dm tall; leaves 5-9 cm long, 2-6 mm wide; calyx glandular. Rare; sandstone outcrops, ridge east of Castro Peak.

7. **Spergula** L.

1. ***S. arvensis** L. Erect annual; leaves linear, with small scarious stipules; flowers in terminal cymose panicles. Locally abundant on sandy flats near the coast. 3-4. Native of Europe.

8. **Spergularia** J. & C. Presl.

1a. Perennial; leaves densely fascicled; sepals 6-10 mm long — 2. **S. macrotheca**
1b. Annual; leaves not densely fascicled; sepals 2.5-5.5 mm long
  2a. Stamens 6-10 — 1. **S. bocconii**
  2b. Stamens 2-5 — 3. **S. marina**

1. **S. bocconii** (Scheele) Aschers & Graebn. Annual 0.5-3 dm tall, glandular-pubescent. Disturbed areas; Malibu Creek dirt rd., Big Sycamore Canyon.

2. **S. macrotheca** (Hornem.) Heynh. var. **macrotheca.** Coarse perennial from a stout taproot; petals pink, 4-7 mm long; styles 0.6-1.2 m long. Common in salt marshes along the entire coast. 3-9.

3. **S. marina** (L.) Griseb. Diffuse annual; petals white or pink, 2-4 mm long; styles 0.4-0.6 mm long. Common in salt marshes along the entire coast. 3-9.

9. **Stellaria** L.

1a. Stems with a longitudinal line of fine erect hairs; upper leaves ovate, acute — 1. **S. media**
1b. Stems glabrous; upper leaves narrowly lanceolate, acuminate — 2. **S. nitens**

1. ***S. media** (L.) Vill. Common Chickweed. Annual with procumbent stems; sepals pubescent, ovate. Occasional weed of waste places and about cultivated areas. 2-4. Native of Eurasia.

2. **S. nitens** Nutt. Erect annual, stems very slender, delicate, sparsely leafy; sepals glabrous, lanceolate, acuminate. Scattered throughout, mostly in grassland, but inconspicuous and seldom collected. 4-5.

CHENOPODIACEAE Goosefoot Family

1a. Leaves scale-like, opposite; stems jointed and fleshy	
2a. Seeds glabrous; spikes sterile in upper part	1. **Arthrocnemum**
2b. Seeds pubescent; spikes fertile to top	6. **Salicornia**
1b. Leaves not scale-like	
3a. Leaves linear, ± fleshy	
4a. Leaves bristle-tipped	7. **Salsola**
4b. Leaves not bristle-tipped	8. **Suaeda**
3b. Leaves not linear	
5a. Flowers unisexual, pistillate ones enclosed in 2 accrescent bractlets	2. **Atriplex**
5b. Flowers hermaphroditic	
6a. Calyx becoming tough and thick in fruit; ovary partly inferior	4. **Beta**
6b. Calyx not becoming tough and thick in fruit; ovary superior	
7a. Calyx lobes with hooked spines, plants pilose	3. **Bassia**
7b. Calyx lobes not spiny; plants not pilose	5. **Chenopodium**

1. **Arthrocnemum** Moq.

1. **A. subterminale** (Parish) Standl. [**Salicornia subterminalis** Parish]. Perennial with spreading stems mostly about 2 dm tall. Coastal salt marsh; Point Mugu. 5-9.

2. **Atriplex** L. Saltbush

1a. Plants perennial	
2a. Erect shrubs 1-3 m tall	
3a. Leaves 3-18 mm long, oblong to spatulate	6. **A. polycarpa**
3b. Leaves 15-50 mm long, oblong to ovate-deltoid	4. **A. lentiformis**
2b. Low spreading plants, woody, if at all, only near the base	
4a. Fruiting bracts fleshy at maturity, becoming red	8. **A. semibaccata**
4b. Fruiting bracts green, not fleshy at maturity	
5a. Fruiting bracts broadest at or above their middle, toothed along margins	
6a. Bracts not strongly compressed, 5-7 mm long	5. **A. leucophylla**
6b. Bracts strongly compressed, 2-3 mm long	2. **A. coulteri**
5b. Fruiting bracts broadest below their middle, entire or erose	
7a. Fruiting bracts 5-8 mm long, entire to erose, united above middle; seed ca 1 mm long	10. **A. watsonii**
7b. Fruiting bracts ca 3 mm long, entire, scarcely united; seed ca 2 mm long	1. **A. californica**
1a. Plants annual	
8a. Leaves green or greenish on both surfaces, sparsely mealy and sometimes grayish when young	
9a. Fruiting bracts united only near base, hastate, 2-5 mm long	3. **A. hastata**
9b. Fruiting bracts united to above middle, narrowly orbicular, 2-2.5 mm long	9. **A. serenana**
8b. Leaves gray or whitish with a fine scurf, at least on lower surface	7. **A. rosea**

1. **A. californica** Moq. Prostrate perennial; leaves gray-scurfy; fruiting bracts scarcely united, entire, ca 3 mm long. Occasional on coastal bluffs throughout. 4-11.

2. **A. coulteri** (Moq.) D. Dietr. Low perennial about 2-3 dm tall with scurfy narrow leaves ca 1 cm long; fruiting bracts united to the middle, sharply and evenly dentate in upper half, 2-3 mm long. Rare on coastal bluffs near Point Dume. 3-10.

3. ***A. hastata** L. [**A. patula** L. subsp. **hastata** (L.) Hall & Clements]. Erect, rank annual often to 1 m or more tall; main leaves hastate, 3-5 cm long, green. Frequent in sandy clayey soil, especially in moist places, more common near the coast but scattered elsewhere. 6-11. Native of Eurasia.

4. **A. lentiformis** (Torr.) S. Wats. subsp. **breweri** (S. Wats.) Hall & Clements. Shrub; leaves oblong, 2-4 cm long, 1.5-3 cm wide; fruiting bracts 4-7 mm long, subentire. Frequent along the coast and

at the west end of the range, mostly in coastal sage scrub. 7-11.

5. **A. leucophylla** (Moq.) D. Dietr. Spreading perennial with crowded, densely white-scurfy leaves mostly ca 2-3 mm long; fruiting bracts with teeth or wortlike projections around edges and on face. Colonial on dunes just above the high-tide line. 4-10.

6. ***A. polycarpa** (Torr.) Wats. Erect, intricately branched gray shrub. A colony of ca 10 plants in side canyon to Triunfo Canyon above Westlake Village. Presumably an adventive, but several other interior species also occur on the north side of the mountains nearby.

7. ***A. rosea** L. Redscale. Common annual weed in central part of the range, as in Old Topanga Canyon.

8. ***A. semibaccata** R. Br. Australian Saltbush. Low spreading matted herbaceous perennial; leaves elliptical, coarsely toothed, scurfy when young; fruiting bracts 3-5 mm long, united at base. Common in disturbed ground throughout, especially in coastal sage scrub. 4-12. Native of Australia.

9. **A. serenana** A. Nels. Coarse annual, often sprawling and up to 2 m across; leaves mostly ca 2-3 dm long; fruiting bracts toothed above. Waste ground at low elevations and about coastal salt marshes, scattered. 6-10

10. **A. watsonii** A. Nels. Prostrate, suffrutescent perennial; leaves white-scurfy. Reprorted from Mugu Lagoon, presumably within the boundaries of the flora. 3-10.

3. **Bassia** All.

1. ***B. hyssopifolia** (Pall.) Kuntze. Densely pilose, erect annual with narrowly lanceolate leaves mostly 1-2 cm long, mostly shrivelled by maturity; flowers densely crowded. Common in disturbed ground near the coast. 5-9. Native of Eurasia.

4. **Beta** L.

1. ***B. vulgaris** L. Garden Beet. Fleshy erect glabrous herb with taproot; leaves 1-2 dm long, narrowly ovate. Local escape from cultivation in brackish places; Point Mugu, Point Dume. 7-8. Native of Eurasia.

5. **Chenopodium** L. Goosefoot; Pigweed

1a. Annuals, sometimes robust	
2a. Calyx merely 3-5 toothed, sac-like, becoming enlarged and reticulate in fruit	5. **C. multifidum**
2b. Calyx deeply 5-parted	
3a. Calyx covered with glistening resinous glands	
4a. Glomerules of flowers all in axils of leaves; seeds vertical	7. **C. pumilio**
4b. Inflorescence paniculate; seeds horizontal	1. **C. ambrosioides**
3b. Calyx without glands	
5a. Seeds horizontal	
6a. Leaves shining on upper surface, ± rhombic; seeds 1.5 mm across	6. **C. murale**
6b. Leaves dull on upper surface; seeds 0.9-1.3 mm across	
7a. Pericarp densely and evenly pitted	2. **C. berlandieri**
7b. Pericarp smooth or finely and irregularly pitted	8. **C. strictum**
5b. Seeds vertical; plants ± fleshy	4. **C. macrospermum**
1b. Perennial from a fleshy taproot	3. **C. californicum**

1. ***C. ambrosioides** L. Mexican Tea. Rank annual with a strong odor, up to 1 m or more tall; leaves mostly 2-4 cm long, coarsely toothed; seeds ca 0.7 mm across. Common in waste or disturbed places, especially where moist; throughout. 6-2. Native of tropical America.

2. ***C. berlandieri** Moq. var. **zschakei** (J. Murr.) J. Murr. Rank annual to at least 1.5 m tall, the flowers clustered in terminal panicles. Scattered in waste or disturbed ground throughout, probably not so common as No. 8, which it is similar to. 7-11. Native of interior southern North America.

3. **C. californicum** (S. Wats.) S. Wats. Perennial; stems spreading out and sprawling from a stout fleshy taproot, to 1 m long; leaves mostly 2-5 cm long and about as wide, very coarsely toothed, triangular in outline, long-petiolate; flowers in axillary clusters and a long terminal spike. Occasional in grassland, coastal sage scrub, or southern oak woodland at low elevations throughout. 2-4.

4. **C. macrospermum** Hook. f. var. **farinosum** (S. Wats.) J. T. Howell. Sprawling, thick-stemmed, robust annual; flowers crowded in terminal clusters; seeds about 1 mm long. Occasional about brackish or fresh water along the coast and at the west edge of the range; strand of Lake Sherwood. 7-10.

5. ***C. multifidum** L. Spreading, glandular, strong-scented annual; leaves about 1-2 cm long, nearly entire to pinnatifid, withering by maturity. Common in disturbed places near the coast and in the eastern half of the range. 5-10. Native of South America.

6. ***C. murale** L. Rank annual, somewhat fleshy, with thick, toothed leaves mostly 2-5 cm long. Common in disturbed ground and about crops near the coast and in the east end of the range. 1-12. Native of Europe.

7. ***C. pumilio** R. Br. Slender annual 1-4 dm tall; leaves 1-2 cm long, pinnatifid; seed 0.5 mm across. Weed about plantings, West Los Angeles. 9-10. Native of Australia.

8. ***C. strictum** Roth var. **glaucophyllum** (Aellen) Wahl. Similar to No. 2. Common in disturbed ground and along roads throughout. 7-11. Native of interior North America.

6. **Salicornia** L. Pickleweed

1a. Plants annual
  2a. Joints of spikes thicker than long — 1. **S. bigelovii**
  2b. Joints of spikes longer than thick — 2. **S. europaea**
1b. Plants perennial — 3. **S. virginica**

1. **S. bigelovii** Torr. Erect, succulent annual, 1-5 dm tall. Coastal salt marsh; reported from Mugu Lagoon. 7-11.

2. **S. europaea** L. Bushy, succulent annual, 1-2 dm tall. Open, muddy flats; coastal salt marsh; Point Mugu. 7-11.

3. **S. virginica** L. [**Sarcocornia pacifica** (Standl.) A. J. Scott]. Succulent perennial, mostly about 3 dm tall; terminal fertile spikes plump. Locally abundant in coastal salt marshes and on the upper parts of beaches along the entire coast. 8-11.

7. **Salsola** L.

1. ***S. australis** R. Br. [**S. iberica** Sennen & Pav.; **S. kali** L. var. **tenuifolia** Taush.]. Russian Thistle. Densely branched annual; young leaves soft and fleshy, 3-5 cm long; old stems rigid and densely invested with spine-tipped bracts; fruiting calyx often winged and conspicuous. Abundant throughout in ± disturbed places. Native of Eurasia. 5-11.

8. **Suaeda** Forsk. Sea-Blite

1a. Plants annual; perianth lobes horned — 1. **S. calceoliformis**
1b. Plants perennial, somewhat woody; perianth lobes keeled and/or hood-shaped or rounded
  2a. Plants glabrous; perianth lobes keeled and hooded, unequal; stigmas glabrous without subtending structures, bractlets entire; seeds reddish-brown, shiny — 3. **S. esteroa**
  2b. Plants glabrous, pubescent or glaucous; perianth lobes hood-shaped or rounded, usually equal; stigmas pubescent, linear-lanceolate subtended by a fleshy columnar ring; bractlets ciliate, laciniate or dentate; seeds black — 2. **S. californica**

1. **S. calceoliformis** (Hook.) Moq. [**S. depressa** (auth., non Pursh) S. Wats.]. Erect annual, ca 3 dm tall, usually glaucous. Rare, clayey flat near the ocean, Pacific Palisades. 6.

2. **S. californica** S. Wats. var. **pubescens** Jeps. Low bushy perennial with thick-set fleshy leaves that are usually glaucous and may be somewhat hairy; flowers clustered on terminal branches. Occasional in coastal salt marshes and along beaches, usually in clayey soil, along the entire coast. 8-10.

3. **S. esteroa** Ferren & Whitmore. Glabrous perennial. Irregularly flooded, coastal salt marsh; Mugu Lagoon - type locality.

CISTACEAE Rock-Rose Family

1. **Helianthemum** Mill. Rock-Rose

1. **H. scoparium** Nutt. var. **vulgare** Jeps. Low tufted perennial; branches many, erect, to 5 dm tall; leaves narrowly linear, early deciduous; inflorescence sparsely leafy; flowers many; petals 4-6 mm long, yellow. Dry, sunny slopes, usually on the coastal side of the range, throughout. 3-10.

CONVOLVULACEAE Morning-Glory Family

1a. Plants green, with well-developed leaves	
2a. Styles 2, distinct; erect herb with oblong, densely pubescent leaves 5-10 mm long	
3a. Ovary deeply 2-lobed; green, creeping matted herb	5. **Dichondra**
3b. Ovary entire; erect gray herb	3. **Cressa**
2b. Styles 1, entire or cleft at apex; vines	
4a. Stigma 1, capitate	6. **Ipomoea**
4b. Stigmas 2, linear	
5a. Bracts narrowly spatulate or subulate, 4-5 mm below the calyx	2. **Convolvulus**
5b. Bracts large, round-oval, closely subtending the calyx	1. **Calystegia**
1b. Plants orange, leafless, parasitic	4. **Cuscuta**

1. **Calystegia** R. Br.

1a. Leaves hastate; scrambling vine	1. **C. macrostegia**
1b. Leaves reniform, fleshy; sprawling herb of beaches	2. **C. soldanella**

1. **C. macrostegia** (Greene) Brummitt subsp. **cyclostegia** (House) Brummitt. [**Convolvulus cyclostegius** House]. Perennial, herbaceous vine; leaves 2-5 cm long; corollas 3-4 cm long, white. Common on brushy slopes throughout, especially in coastal sage scrub. 2-5. **Calystegia macrostegia** subsp. **arida** (Greene) Brummitt has also been reported from the range.

2. **C. soldanella** (L.) R. Br. [**Convolvulus soldanella L.**]. Beach Morning-Glory. Sprawling subsucculent perennial; leaves 2-4 cm across; corollas lavender to nearly white, 4-6 cm long. Local, coastal strand; Point Dume and westward. 3-5.

2. **Convolvulus** L. Morning-Glory; Bindweed

1. ***C. arvensis** L. Bindweed. Sprawling perennial vine; corollas 1.5-2 cm long, white. Common in cultivated ground and about fields at low elevations throughout. 5-10. Native of Eurasia.

3. **Cressa** L. Alkali Weed

1. **C. truxillensis** H.B.K. var. **vallicola** (Heller) Munz. Grey tufted perennial 1-2 dm tall, densely leafy; corollas white, ca 5 mm long; stamens exerted. Colonial in low clayey flats; Santa Monica, Point Mugu. 7-10.

4. **Cuscuta** L. Dodder

1a. Corollas 4-5 mm long, the tube about twice as long as the calyx	3. **C. ceanothii**
1b. Corollas 2-5 mm long, the tube about as long as the calyx	
2a. Capsules depressed-globose	

3a. Corollas with scale-like appendages at base of stamens	2. **C. campestris**
3b. Corollas lacking scale-like appendages at base of stamens	1. **C. californica**
2b. Capsules ovoid, longer than thick	4. **C. salina**

1. **C. californica** H. & A. Yellow stemmed parasite; flowers 3-5 mm long, white. Common throughout, especially on **Salvia, Eriogonum fasciculatum, Haplopappus, Corethrogyne,** and **Lotus,** usually in coastal sage scrub or on coastal bluffs, scattered throughout at low elevations. 1-12.

2. **C. campestris** Yuneker. Coarse plants; stems light yellow; corollas 2-3 mm long, white. On streamside vegetation, especially **Xanthium,** near Lake Sherwood. 6-10.

3. **C. ceanothii** Behr. [**C. subinclusa** Dur. & Hilg.]. Stems coarse, wiry, orange; scales present at base of filaments; capsules ovoid, pointed. Common on such shrubs as **Malosma laurina, Ribes, Mimulus longiflorus, Encelia, Solanum xantii,** and on cultivated **Cotoneaster;** throughout but not on the immediate coast. 7-10.

4. **C. salina** Engelm. Stems slender, orange; flowers ca 3 mm long, white. Growing densely on **Salicornia, Jaumea,** and other salt marsh plants, scattered along the coast. 6-10.

5. **Dichondra** Forst. & Forst. f.

1. **D. occidentalis** House. Creeping perennial herb. Locally abundant but quite inconspicuous, on bare slopes after fires; La Jolla Valley, slopes above Mugu Lagoon, lower Big Sycamore Canyon.

6. **Ipomoea** L.

1. ***I. purpurea** (L.) Roth. Common Morning-Glory. Scrambling rank annual vine with densely short-pubescent, cordate, sometimes shallowly lobed leaves; sepals long-acuminate, 15-20 mm long; corollas rose, ca 5 cm long, blue after pollination. Locally abundant on wooded or brushy slopes, especially by streams near the coast from the vicinity of Santa Monica to Point Dume. 5-11. Native of tropical America.

CORNACEAE Dogwood Family

1. **Cornus** L.

1. **C. glabrata** Benth. Brown Dogwood. Sprawling shrub, 1.5-6 m tall, forming large thickets; twigs slender, subglabrous, brownish; leaves 2-5 cm long, acute, subglabrous; inflorescence a compact cyme, 2.4-4.5 cm across; drupes white to bluish. Rare in shaded canyons, Malibu Creek State Park and above Seminole Hot Springs. 5-6.

CRASSULACEAE Stonecrop Family

Contributed by Kei M. Nakai

1a. Diminutive annual, stamens equalling the number of calyx lobes	1. **Crassula**
1b. Perennial; stamens twice the number of calyx lobes	
2a. Inflorescence arising laterally from the basal rosette; plants unbranched to caespitosely branched	2. **Dudleya**
2b. Inflorescence arising terminally from the basal rosette; plants branched stoloniferously	3. **Sedum**

1. **Crassula** L.

1. **C. connata** (R. & P.) Berger. [**C. erecta** (H. & A.) Berger, **Tillaea erecta** H. & A.]. Slender annual, mostly less than 5 cm tall; leaves 1.5-3 mm long, fleshy; sepals mostly 4, 1 mm long; petals 1 mm long. Common throughout, often in sandy or shallow soil, sometimes in shade of shrubs. 2-4.

2. **Dudleya** Britt. & Rose Live-Forever

1a. Primary stem underground (corm); corolla open, petals wide spreading; leaves linear to linear-oblanceolate, usually withering before flowering (Subgenus **Hasseanthus** Britt. & Rose).

2a. Flowers white, often with musky sweet scent; corm usually globose **1. D. blochmaniae**

2b. Flowers yellow; corm oblong **5. D. multicaulis**

1b. Primary stem above ground (caudex); corolla tubular, only petal tips spreading; leaves lanceolate to ovate (Subgenus **Dudleya**)

3a. Rosette leaves withering in summer; caudex 2-6 mm in diameter

4a. Flowers pale yellow; roots constricted at irregular intervals; leaves often deciduous; Conejo Grade and vicinity **6. D. parva**

4b. Flowers bright yellow to orange; roots not constricted at irregular intervals; dried leaves often remain attached for a year; Little Sycamore Canyon and Malibu Creek **3. D. cymosa marcescens**

3b. Rosette leaves evergreen; caudex mostly 1 cm or more in diameter

5a. Rosette large, 2-5 dm in diameter; leaves broadly oblong to ovate, with dense white powder; petals united for more than 1/3 their length, red **7. D. pulverulenta**

5b. Rosette small to medium, 5-15 cm in diameter; leaves green to glaucous; petals united for less than 1/3 their length, yellow to red

6a. Plants with several to many rosettes; caudex elongated, 1-6 dm long; leaves comparatively thick

7a. Rosette small, mostly less than 5 cm in diameter; inflorescence to 15 cm tall; flowers pale yellow, petal tips spreading to 90° or more from vertical **8. D. verityi**

7b. Rosette 5-15 cm in diameter; inflorescence 2-5 dm tall; flowers yellow to red, petal tips spreading mostly less than 45° from vertical **2. D. caespitosa**

6b. Plants with one to few rosettes; caudex usually short; leaves comparatively thin

8a. Leaves mostly less than 5 cm long, oblanceolate to ovate; inflorescence mostly less than 2 dm tall; pedicels often longer than 6 mm long; diploid **3.D. cymosa**

8b. Leaves usually greater than 5 cm long, oblong to lanceolate, infrequently ovate; inflorescence 15-50 cm long; pedicels often less than 6 mm long; tetraploid **4.D. lanceolata**

1. **D. blochmaniae** (Eastw.) Moran subsp. **blochmaniae.** [**Hasseanthus kessleri** A. Davids.]. Perennial with fleshy leaves; rosette leaves 5-8, linear-oblanceolate, 2-7 cm long; inflorescence to 15 cm tall; flowers subsessile, white. Stony, open slopes, often in clay; common from near Conejo Grade south to Long Grade Canyon; rare at Point Dume; formerly at Malibu Beach and Santa Monica Canyon. Conejo Grade is the type locality of **H. kessleri**. Diploid (n=17) in our area. 5-6.

2. **D. caespitosa** (Haw.) Britt. & Rose. Perennial; rosette leaves oblong to lanceolate, 5-12 cm long; inflorescence 2-5 dm tall; flowers bright yellow to red. On coastal sandy bluffs and slopes west of Point Dume. Hexaploid or octoploid (n=51 or 68). A decaploid (n=85) population near the mouth of Arroyo Sequit with red flowers and lanceolate leaves has been referred to **D. palmeri** (Wats.) Britt. & Rose. 5-7.

3. **D. cymosa** (Lem.) Britt. & Rose. Perennial; leaves mostly less than 5 cm long, oblanceolate, elliptic, or ovate; inflorescence less than 2 dm tall; pedicels often greater than 6 mm; flowers yellow, orange, red, or yellow with red markings. Scattered on rocky, north-facing cliffs and slopes, often in shade, from Topanga Canyon to vicinity of Lake Sherwood. All forms are diploid (n=17). 5-6. This morphologically complex species is represented by four somewhat distinct forms which can be separated by the following key:

1a. Flowers a pure yellow, not marked with red
  2a. Leaves ovate to elliptic, green with maroon suffusion on underside; plants unbranched. Topanga and Malibu Canyons — a. Topanga Form subsp. **ovatifolia** (Britt.) Moran
  2b. Leaves elliptic to oblong, glaucous; plants with one to few brances; Agoura west to near Lake Sherwood — b. Agoura Form
1b. Flowers orange to red, or if yellow then petals marked with red
  3a. Leaves oblanceolate, green, 1-3 mm thick, withering in summer; Little Sycamore Canyon and upper Malibu Creek. Endemic — c. Little Sycamore Form subsp. **marcescens** Moran
  3b. Leaves elliptic to ovate, green or glaucous, 2.5 to 4.5 mm thick, evergreen; western portion of the range, Old Topanga Canyon to Hidden Valley — d. Hidden Valley Form

4. **D. lanceolata** (Nutt.) Britt. & Rose [**D. brautonii** Rose, **D. lurida** Rose]. Perennial, leaves mostly greater than 5 cm long, oblanceolate to lanceolate, rarely elliptic; inflorescence 15 to 50 cm tall; pedicels less than 6 mm long; petals orange or pale green with reddish tinge. Common throughout the range on rocky slopes and banks, often in somewhat protected situations. Plants similar to **D. cymosa** with ovate leaves differ by having a taller inflorescence, somewhat shorter pedicels, and being a tetraploid (n=34). 5-6.

5. **D. multicaulis** (Rose) Moran. Perennial; rosette leaves 6-15, linear, 3-15 cm long; inflorescence to 35 cm tall; flowers yellow, short pedicelled. Formally at Santa Monica, the type locality, and in the hills above Hollywood. Probably extinct in the range. Diploid (n=17). 5-6.

6. **D. parva** Rose & A. Davids. Perennial; rosette leaves oblanceolate, 1.5-4 cm long, 3-6 mm wide, glaucous at least when young; inflorescence 15 cm tall; pedicels 2-5 mm long; petals united 2-3 mm, pale yellow. In rocky clay grassland near and north of Conejo Grade, the type locality. Also found in the vicinity of Arroyo Santa Rosa and Wildwood Park, just to the north. Diploid (n=17). 5-6.

7. **D. pulverulenta** (Nutt.) Britt. & Rose. Perennial; rosette coated with a dense, white powdery wax; caudex 4-9 cm thick; rosette leaves broadly oblong to ovate, 8-25 cm long, 4-10 cm wide; inflorescence 4-8 dm tall; petals deep red. Common on rocky south or west facing slopes and beach at Mugu Lagoon. Diploid (n=17). 5-7.

8. **D. verityi** K. Nakai. Perennial; rosette leaves oblong to oblanceolate, 2-5 cm long; inflorescence 10-15 cm tall; flowers pale, lemon-yellow. North-facing volcanic rocky slopes from Mt. Conejo to Long Grade Canyon, the type locality. Diploid (n=17). 5-6. Endemic.

3. **Sedum** L. Stonecrop

1. **S. spathulifolium** Hook. Low matted perennial, stoloniferously branched; flowers yellow. Rare on cliff in Malibu Creek State Park. 5-7.

CUCURBITACEAE Gourd Family

1a. Fruit not spiny; corollas yellow, 9-12 cm long — 1. **Cucurbita**
1b. Fruit spiny; corollas white, about 15 mm in diameter — 2. **Marah**

1. **Cucurbita** L. Gourd

1. **C. foetidissima** H.B.K. Calabazilla. Rank, ill-scented, rough-hairy, sprawling, monoecious perennial from a large fleshy root; stems to over 4 m long; leaves triangular, up to 2.5 dm long; flowers yellow; fruits up to 10 cm long, green with light stripes. Occasional along roadsides on open grassy slopes and flats or in southern oak woodland along the north slope of the mountains. 6-9.

2. **Marah** Kell. Man-Root

1. **M. macrocarpus** (Greene) Greene. Trailing monoecious vine from a huge fleshy root up to at least 1 m long; leaves long-stalked, palmately lobed, mostly 5-10 cm across; flowers white; fruits more or less spiny, up to 12 cm long. Common throughout on open or usually shaded slopes in various plant associations. 1-6.

DATISCACEAE

1. **Datisca** L.

1. **D. glomerata** (Presl.) Baill. Stout, glabrous, dioecious, perennial herb, usually over 1 m tall; leaves alternate, up to 2 dm long, pinnately incised; flowers clustered in axils of a leafy raceme; capsules ca 8 mm long. Common in canyons near water in the western portion of the range. 5-8.

ELATINACEAE Waterwort Family

1. **Elatine** L.

1. **E. californica** A. Gray. Aquatic annual, often rooting at the nodes; leaves oblanceolate, to 4 mm long; flowers pedicelled, 4-merous; capsules with 4 carpels; seeds very strongly curved, seed coat pitted with ca 25 pits in each row. Mud and shallow water around the margins of ponds; Santa Monica.

ERICACEAE Heath Family

1a. Leaves entire; surface of fruit smooth	1. **Arctostaphylos**
1b. Leaves serrate; surface of fruit prominently papillose	2. **Comarostaphylis**

1. **Arctostaphylos** Adans. Manzanita

1a. Young stems conspicuously pubescent with long spreading hairs; plants sprouting from basal burl after fire; bracteoles lanceolate, more than half as long as the pedicel	1. **A. glandulosa**
1b. Young stems glabrous or nearly so, glaucous; burl lacking, plants not sprouting after fire; bracteoles broad at base and subulate, less than a fourth as long as the pedicel	2. **A. glauca**

1. **A. glandulosa** Eastw. subsp. **glandulosa**. Shrub ca 1-3 m tall; corolla white. Occasional throughout the mountains in open chaparral, usually above 500 ft and away from the coast. 1-3. A hybrid between **A. glandulosa** and **A. glauca** was found where the two species occur together east of Saddle Peak.

2. **A. glauca** Lindl. Bigberry Manzanita. Shrub usually 2-5 m tall, sometimes arborescent; corolla white or with some pink. Open chaparral above 500 ft and away from the coast; Topanga Canyon west to Saddle Rock area. 2-3.

2. **Comarostaphylis** Zucc.

1. **C. diversifolia** (Parry) Greene subsp. **planifolia** (Jeps.) G. Wallace ex Thorne. Shrub ca 3-4 m tall; leaves elliptic, 4-6 cm long, with a felt-like pubescence on lower surface; corolla white. Rare, chaparral and southern oak woodland; Las Tunas, Topanga, and Rustic Canyons. 2-4.

EUPHORBIACEAE Spurge Family

1a. Leaves palmately lobed, 1-5 dm across; fruits spiny — 5. **Ricinus**
1b. Leaves entire or finely toothed, smaller; fruits not spiny
  2a. Stems covered with long spreading hairs — 3. **Eremocarpus**
  2b. Stems with appressed pubescence or glabrous
    3a. Leaves and stems densely covered with stellate scales; plants dioecious, without milky juice — 2. **Croton**
    3b. Leaves and stems with short appressed hairs or glabrous; plants monoecious, with milky juice
      4a. Leaves symmetrical at base; glands 5, all alike; stipules gland-like or lacking — 4. **Euphorbia**
      4b. Leaves asymmetrical at base; glands 4, the fifth represented by a minute lobe or a notch in side of involucre or totally lacking; stipules present usually subulate, not glandular — 1. **Chamaesyce**

1. **Chamaesyce** S. F. Gray

1a. Plants annual
  2a. Capsules hairy — 2. **C. maculata**
  2b. Capsules glabrous — 5. **C. serpyllifolia**
1b. Plants perennial, matted
  3a. Capsules glabrous
    4a. Stipules united into a broad white scale — 1. **C. albomarginata**
    4b. Stipules narrow, inconspicuous — 4a. **C. polycarpa polycarpa**
  3b. Capsules hairy
    5a. Hairs on leaves and stems erect — 4b. **C. polycarpa hirtella**
    5b. Hairs on leaves and stems appressed, dense — 3. **C. melanadenia**

1. **C. albomarginata** (T. & G.) Small. [**Euphorbia albomarginata** T. & G.]. Prostrate perennial. Weed about cultivated fields near Point Dume. Perhaps introduced. 7-11.

2. ***C. maculata** (L.) Small. [**Euphorbia maculata** L., **E. supina** Raf.]. Prostrate annual; leaves all opposite, often black-dotted in center, hairy, entire, asymmetrical at base, short-petioled. Common weed in waste ground or about plantings, scattered throughout at low elevations. 4-11. Native of eastern North America.

3. **C. melanadenia** (Torr.) Millsp. [**Euphorbia melanadenia** Torr.]. Matted perennial. Occasional on stony slopes from Sepulveda Canyon east.

4a. **C. polycarpa** (Benth.) Millsp. var. **polycarpa**. [**Euphorbia polycarpa** Benth. var. **polycarpa**]. Glabrous, prostrate perennial. Frequent, especially in hardpacked sandy soil, low elevations along the south side and in the west end of the range. 3-10.

4b. **C. polycarpa** var. **hirtella** (Boiss.) Millsp. [**Euphorbia polycarpa** var. **hirtella** Boiss.]. Pubescent, prostrate perennial. Stabilized dunes near Point Mugu. 4-10.

5. **C. serpyllifolia** (Pers.) Small. [**Euphorbia serpyllifolia** Pers.]. Glabrous annual. Along creeks and about lakes, occasional; north slopes of west end of range. 7-10.

2. **Croton** L. Croton

1. **C. californicus** Muell.-Arg. Spreading perennial, often somewhat woody at the base; leaves mostly 2-4 cm long, 8-23 mm wide, oblong; ovary 3-loculate; seeds 3-4 mm long. Sandy slopes and flats along the entire coast and in washes at the west end of the range. 4-11. A variable species with ill defined varieties. Plants with leaves 8-23 mm wide and petioles 1-3.5 cm long are var. **californicus.** Plants with leaves 5-10 mm wide and petioles 0.5-1 cm long are var. **tenuis.**

3. **Eremocarpus** Benth.

1. **E. setigerus** (Hook.) Benth. Turkey-Mullein. Robust spreading monoecious annual; leaves broadly ovate, 1-8 cm long, 0.7-5 cm wide; ovary 1-loculate; seeds 3-4 mm long. Open grassy slopes or disturbed places throughout; frequent. 6-11.

4. **Euphorbia** L. Spurge

1a. Seeds brown, globose, finely and narrowly ridged; stem leaves narrowed at base	1. **E. crenulata**
1b. Seeds gray, oblong, deeply and conspicuously pitted; stem leaves distinctly petioled	2. **E. peplus**

1. **E. crenulata** Engelm. Erect, subsucculent annual; leaves near inflorescences cordate. Shaded slope in southern oak woodland; Malibu Creek. 4-5.

2. ***E. peplus** L. Petty Spurge. Erect subsucculent annual; leaves on upper branches opposite, those on main stem alternate. Common weed about gardens, along roadsides, and in waste places at low elevations throughout. 1-12. Native of Eurasia and north Africa.

5. **Ricinus** L.

1. ***R. communis** L. Castor-Bean. Shrubby monoecious perennial 1-3 m tall; leaves peltate; seeds shiny, ca 6-10 mm long, mottled brown. Common in disturbed ground, about plantings, or along roads throughout. 1-12. Native of the warm regions of the Old World.

FABACEAE Pea Family

1a. Filaments distinct to base; thorny shrub with reddish-purple flowers	9. **Pickeringia**
1b. Filaments, at least some of them, united for one half of their length	
2a. Leafless or with few, simple linear leaves; erect shrubs with green stems; flowers yellow, 2-2.5 cm long	11. **Spartium**
2b. Leaves compound	
3a. Leaflets 3	
4a. Leaves palmately 3-foliolate; flowers in spheroid or oblong heads	12. **Trifolium**
4b. Leaves pinnately 3-foliolate; flowers in spikes or racemes	
5a. Leaflets gland-dotted	10. **Psoralea**
5b. Leaflets not gland-dotted	
6a. Leaflets toothed or crenate	
7a. Pods curved or coiled; style short and stout	7. **Medicago**
7b. Pods ovoid, not curved or coiled; style long, slender	8. **Melilotus**
6b. Leaflets entire	5. **Lotus**
3b. Leaflets 5 or more	
8a. Leaves palmately compound	6. **Lupinus**
8b. Leaves pinnately compound	
9a. Leaves with tendrils	
10a. Style pubescent on one side	4. **Lathyrus**
10b. Style pubescent in ring below stigma	13. **Vicia**
9b. Leaves without tendrils	
11a. Leaflets gland-dotted; large shrub to small tree or herbaceous perennial	
12a. Petal 1; large shrub or small tree	1. **Amorpha**
12b. Petal 5; herbaceous perennial	3. **Glycyrrhiza**
11b. Leaflets not gland-dotted; pods mostly dehiscent; herbaceous perennials or annuals	
13a. Flowers solitary or in umbels	5. **Lotus**
13b. Flowers in racemes	2. **Astragalus**

1. **Amorpha** L. False Indigo

1. **A. californica** Nutt. Deciduous shrub; petals one, red-purple banner present, keel and wings lacking. Southern oak woodland on the north side of the western half of the range, below 2000 ft. 5-7.

2. **Astragalus** L. Locoweed

1a. Plants annual, mostly ca 1-2 dm tall; flowers 2-6 mm long	
2a. Pods less than 0.5 cm long, orbicular, usually 2-seeded	
3a. Flowers spreading or nodding at anthesis; pods deflexed	3. **A. gambelianus**
3b. Flowers erect, in dense ovoid heads; pods erect	2. **A. didymocarpus**
2b. Pods usually ca 1 cm long, several times longer than wide, usually with 5 or more seeds	5. **A. tener**
1b. Plants perennial, 2-15 dm tall; flowers 7-15 mm long	
4a. Stems covered with dense white tomentum; pods sessile or subsessile,	
5a. Pods 2-locular; petals dull lilac	1. **A. brauntonii**
5b. Pods 1-locular; petals yellowish-white	4. **A. pycnostachyus**
4b. Stems strigose or glabrous; pods with a long stipe	
6a. Body of pod 1-2 cm in diameter, usually bladdery-inflated, strigose	6a. **A. trichopodus leucopsis**
6b. Body of pod 0.4-0.9 cm in diameter, usually glabrous, laterally compressed and 2-sided, not inflated	6b. **A. trichopodus antisella**

1. **A. brauntonii** Parish. Stout perennial, sometimes with a woody trunk and up to 1.5 m tall; petals dule lilac, banner 9-12 mm long; pod 6.5-9 mm long, 3-4 mm in diameter. Very rare; above firebreaks, in disturbed soil, or on burns; vicinity of Temescal, Topanga and Malibu canyons. The type locality is above Sherman Oaks. 2-6.

2. **A. didymocarpus** H. & A. Erect to decumbent annual; leaflets 7-17; calyx tube 1.5-2.5 mm long. Grassy slope; Benedict Canyon. 3-4.

3. **A. gambelianus** Sheld. Erect; leaflets 7-13; calyx tube 1-1.5 mm long; racemes 4-15 flowered; petals whitish with violet tinge; pod 3-4 mm long, flattened. Grassland in shallow soil; Las Trancas Canyon, Triunfo Pass. 3-4.

4. **A. pycnostachyus** A. Gray var. **lanosissimus** (Rydb.) Munz & McBurne ex Munz. Ventura Marsh Milk Vetch. Stout, leafy perennial, 4-9 dm tall; herbage white silky-tomentose; petals yellowish-white; banner 7-10 mm long; pod 8-11 mm long. Coastal salt marshes. Very rare if not already extirpated from our area; not actually known in our area but may occur at Mugu Lagoon.

5. **A. tener** A. Gray var. **titi** (Eastw.) Barneby. Erect; leaflets 7-17; racemes 3-12 flowered; calyx tube 2-3 mm long; petals purple. On vernally moist clay flats; near Santa Monica, **Hasse**, March, 1891 (DS). 4-5. Presumed extant.

6a. **A. trichopodus** (Nutt.) Gray subsp. **leucopsis** (T. & G.) Thorne. [**A. t.** var. **lonchus** (Jones) Barneby; **A. leucopsis** (T. & G.) Torr.]. Low bushy perennial; petals mostly greenish-white, banner 11-19 mm long; pod 2-4.5 cm long, 1-loculate. Common in coastal sage scrub near the coast; from the Pacific Palisades to Point Mugu and inland along the western edge of the mountains. 2-4.

6b. **A. trichopodus** subsp. **antisella** (A. Gray) Thorne. [**A. t.** var. **phoxus** (Jones) Barneby; **A. antisellii** A. Gray]. Pods 1.5-3.5 cm long, 1-loculate. Occasional in coastal sage scrub away from the immediate coast, especially where disturbed; vicinity of Malibu Creek to Sepulveda Canyon. 300-1700 ft. 2-5.

3. **Glycyrrhiza** L. Licorice

1. **G. lepidota** (Nutt.) Pursh var. **glutinosa** (Nutt.) S. Wats. Erect perennial herb, 3-10 dm tall; leaflets 11-19; corolla yellowish-white; pod oblong, burlike with hooked prickles. Rare; streamside thicket, Malibu Creek State Park, **Grayum & Gillen s.n.** (SFV). 9.

4. **Lathyrus** L.

1. **L. laetiflorus** Greene subsp. **barbarae** (White) C. L. Hitchc. Vine with tendrils, climbing over shrubs; flowers white, more or less streaked with lavender, in axillary racemes. Plants of our area variable in flower color and shape of the leaflets; some have the lateral calyx lobes broadened above the base. The Santa Monica Mountains populations are part of a broad zone of intergrada-

tion between the central and northern California **L. vestitus** Nutt. ex T. & G. and the southern California **L. laetiflorus**. The two should probably be considered conspecific. Common throughout in more or less protected situations, coastal sage scrub, chaparral, or southern oak woodland. 3-5.

5. **Lotus** L.

1a. Stipules expanded, not glandlike
  2a. Stipules leaflike; leaflets 3 — 2. **L. corniculatus**
  2b. Stipules membranous; leaflets ca 7-11 — 6. **L. oblongifolius**
1b. Stipules glandlike
  3a. Plants perennial
    4a. Flowers 1.5-2.4 cm long; pods 3-4 cm long, readily dehiscent at maturity — 3. **L. grandiflorus**
    4b. Flowers 0.7-1.0 cm long; pods 1-1.5 cm long, indehiscent
      5a. Plants sprawling; leaves and calyces densely silvery-pubescent — 1. **L. argophyllus**
      5b. Plants erect; leaves and calyces strigose or glabrous — 9. **L. scoparius**
  3b. Plants annual
    6a. Pods indehiscent, strigose, with the beak twisted into a hook — 4. **L. hamatus**
    6b. Pods dehiscent, straight or nearly so
      7a. Corollas white, pink, or salmon tinged with rose or red
        8a. Calyx teeth longer than the tube; leaflets 3, usually villous pubescent; corolla white, tinged with rose — 7. **L. purshianus**
        8b. Calyx teeth shorter than the tube; leaflets 3 or 5, usually glabrous; corolla pink or pale salmon, tinged with red — 5. **L. micranthus**
      7b. Corollas yellow, often aging red
        9a. Flowers clustered, the clusters pedunculate
          10a. Keel equal to or exceeding wings in length; styles glabrous; seeds smooth; leaflets broadly oblanceolate to ovate — 8. **L. salsuginosus**
          10b. Keel much shorter than wings; styles hairy at base of stigma; seeds granulose; leaflets narrowly elliptical — 10. **L. strigosus**
        9b. Flowers solitary, axillary — 11. **L. subpinnatus**

1. **L. argophyllus** (A. Gray) Greene var. **argophyllus**. Prostrate perennial, woody at the base; umbels subsessile, 3-8 flowered; corollas yellow, 8-10 mm long. Colonial and locally common on sandstone outcrops; Saddle Peak, 2350 ft; La Sierra Canyon. 4-5.

2. ***L. corniculatus** L. Herbaceous perennial with bright golden-yellow flowers 8-12 mm long, in 3-6 flowered pedunculate umbels. Infrequent weed of cultivated ground, pastures and margins of fields; Triunfo Corner, Lake Sherwood. 5-9. Native of Eurasia, N. & E. Africa.

3. **L. grandiflorus** (Benth.) Greene. Herb perennial, ca 0.5 m tall; leaflets mostly 7-9; peduncles 4-8 cm long; corollas yellow, aging red. Openings and disturbed places in chaparral, colonial, 1300 to 2300 ft; Santa Monica and Temescal canyons to the vicinity of Saddle Peak. 1-5.

4. **L. hamatus** Greene. Prostrate annual; umbels axillary; flowers 5-7 mm long, yellow. Coastal sage scrub, very rare; Topanga Canyon. 5.

5. **L. micranthus** Benth. Diffuse annual, 1-3 dm tall; corolla 4-5 mm long, pinkish or pale salmon, turning red. Santa Monica (Abrams 1904, p 217). 3-5.

6. **L. oblongifolius** (Benth.) Greene var. **oblongifolius**. Herbaceous perennial from slender rootstalks; flowers in pedunculate umbels; corollas yellow, veined with purple, 9-14 mm long. Moist places; reported from Santa Monica (Jepson 1936, v 2, p 316).

7. **L. purshianus** (Benth.) Clem. & Clem. var. **purshianus**. Erect annual; flowers long-pedicellate, 4-7 mm long; corollas whitish, tinged pink. Flowers later than other annual species of **Lotus**. Common in southern oak woodland on northern slope of range from Topanga Canyon westward, below 2000 ft; Los Alisos Canyon. 5-9.

8. **L. salsuginosus** Greene. Subsucculent annual; corolla yellow; pods 1.5-3 cm long, 1.5-2 mm wide. Sandy beaches, sea bluffs, coastal sage scrub, and openings in chaparral, scattered at low elevations throughout. 2-5.

9. **L. scoparius** (Nutt.) Ottley var. **scoparius.** Deerbush. Suberect shrub to 1 m tall; umbels subsessile, 3-6 flowered; corollas yellow, 7-10 mm long. Abundant on ocean bluffs, in coastal sage scrub, and in disturbed chaparral throughout. 1-12.

10. **L. strigosus** (Nutt.) Greene. Annual; corolla yellow turning reddish; pods 2-3 cm long, 2-3 mm wide. Coastal bluffs and coastal sage scrub along southern slope of range from Point Mugu to Westwood. 3-5.

11. **L. subpinnatus** Lag. Annual; corollas yellow, reddish after pollination; pod 10-15 mm long, ca 3 mm wide. Infrequent in coastal sage scrub and southern oak woodland at low elevations from vicinity of Malibu Canyon eastward. 4-5.

6. **Lupinus** L. Lupine

1a. Perennials	
2a. Shrubs	
3a. Banner always pubescent on back and upper margins of the keel, glabrous; coastal strand	3. **L. chamissonis**
3b. Banner usually glabrous, rarely pubescent on back; keel usually pubescent on upper margin; openings in coastal sage scrub and chaparral	7. **L. longifolius**
2b. Herbaceous	
4a. Leaves densely long pubescent on upper surface; keel not pubescent on upper margin	4. **L. formosus**
4b. Leaves glabrate on upper surface; keel pubescent on upper margin	6. **L. latifolius**
1b. Annuals	
5a. Stems and leaves with long, light brown, stinging hairs	5. **L. hirsutissimus**
5b. Plants without stinging hairs	
6a. Flowers arranged in definite whorls on inflorescence	
7a. Keel ciliate near claw either on upper or lower margin	
8a. Keel glabrous on lower margin; flowers becoming erect after anthesis; petals white to pink-lavender	11. **L. subvexus**
8b. Keel ciliate on lower margin near claw; flowers spreading after anthesis; petals blue, rarely white	12. **L. succulentus**
7b. Keel glabrous on lower margin, upper margin glabrous or ciliate only on apical half	
9a. Pedicels 4-6 mm long; flowers 11-15 mm long	8. **L. nanus**
9b. Pedicels less than 3 mm long; flowers 4-8 mm long	
10a. Keel with upturned beak; leaflets pubescent on upper and lower surfaces	
11a. Banner oval, lemon-shaped when flattened	2a. **L. bicolor microphyllus**
11b. Banner oblong, truncate	2b. **L. bicolor tridentatus**
10b. Keel nearly straight, blunt; leaflets pubescent on margins and lower surface, glabrous above	9. **L. polycarpus**
6b. Flowers not in definite whorls on inflorescence	
12a. Keel densely ciliate-wooly on upper margins	13. **L. truncatus**
12b. Keel glabrous or only sparsely ciliate on upper margins near the claw	
13a. Flowers 6-8 mm long; keel nearly straight, blunt, completely glabrous	1. **L. agardhianus**
13b. Flowers 11-14 mm long; keel curved upward with a few scattered hairs on the upper margin near the claw	10. **L. sparsiflorus**

1. **L. agardhianus** Heller. [**L. concinnus** J. G. Agardh var. **agardhianus** (Heller) C. P. Smith]. Annual, to 2 dm tall; leaflets about 1 cm long, pubescent with long hairs; flowers bluish-purple. Open grassy areas in chaparral above 2000 ft; Triunfo Pass, crest east of Castro Peak, Saddle Peak. 4-5.

2a. **L. bicolor** Lindl. subsp. **microphyllus** (S. Wats.) D. Dunn. Annual, to 4 dm tall; racemes to 5 cm long; flowers blue with white spot on banner; banner oval, lemon-shaped, mucronate; keel with a short blunt acumen. Occasional throughout the area on burns and distrubed places. 3-5.

2b. **L. bicolor** Lindl. subsp. **tridentatus** (Eastw.) D. Dunn. Like the preceding, but racemes to 11 cm long; banner oblong, truncate; keel with slender acumen. Known only from one collection, Elysian Hills, **Braunton 819**. 3-5.

3. **L. chamissonis** Esch. Shrub, to 1 m tall; leaves silvery; petals blue or lavender, keel slender with a long acumen. Growing in beach sand in coastal strand or dunes; Santa Monica. 3-4.

4. **L. formosus** Greene var. **formosus**. Perennial herb less than 1 m tall, densely covered with long, subappressed pubescence; flowers violet or blue to lilac or lavender. Open grassland, Elysian Park, **Braunton 749**. 5-7.

5. **L. hirsutissimus** Benth. Robust annual, to 8 dm tall; leaflets broadly oblanceolate, 13-20 mm wide; flowers reddish-lavender, 12-15 mm long. Occasional on burns and distrubed places in the central portion of the area. 4-5.

6. **L. latifolius** J. G. Agardh. Perennial herb, to 1 m tall; petal blue or purplish or with some pink, fading to brown. Nichols Canyon, Santa Monica Mountains, **F. W. Peirson 464** (RSA), Seminole Hot Springs, Cold Creek.

7. **L. longifolius** (S. Wats.) Abrams. Weak shrub, to 1.5 m tall; petals blue to violet, keel broader than in **L. chamissoinis**. Openings in chaparral and coastal sage scrub throughout the mountains. 4-6. Some of the specimens of this species have pubescence on the back of the banner while others have the upper margins of the keel glabrous, pubescent apically, or pubescent throughout. It appears that this variable group of populations of the Santa Monica Mountains is a single species. The specimens with a pubescent banner probably account for the report by Jepson (1936, p 251) that **Barber 23**, from Santa Monica, was **L. albifrons** Benth. ex Lindl.

8. **L. nanus** Dougl. subsp. **latifolius** (Benth. ex Torr.) D. Dunn. Erect annual, to 4 dm tall; flowers blue except for yellowish or white spot on prominent, reflexed banner. Known only from one collection, Santa Monica, **Barber**, April 29, 1899. 4-5.

9. **L. polycarpus** Greene. [**L. micranthus** Dougl., non Guss.]. Annual, much like **L. bicolor**; petals deep blue, the banner with white spot having purple dots. Occasional in grassy areas; Thousand Oaks, Westwood. 3-4.

10. **L. sparsiflorus** Benth. subsp. **sparsiflorus**. Annual, to 5 dm tall; petals light blue or lilac, except for yellow spot on banner. Open areas in chaparral or southern oak woodland. Occasional in the western half of the area at high elevation and on the north side of the range. 4-5.

11. **L. subvexus** C. P. Smith. Villous annual, to 5 dm tall, pedicels 1-3 mm long; flowers in dense, discrete whorls, petals dark violet-purple, lilac or rose-pink. Rare in grassy areas in southern oak woodland; vicinity of Malibu Creek on the north side of the mountains. 4-5.

12. **L. succulentus** Dougl. ex Koch. Succulent, often fistulous, annual up to 8 dm tall; flowers deep purple blue, banner usually with yellow center. On burns and disturbed places throughout the area below 1500 ft. 2-4.

13. **L. truncatus** Nutt. ex H. & A. Annual, to 6 dm tall; leaves and stems usually glabrous but sometimes with scattered, long hairs; leaflets narrow and often truncate; flowers purple-blue, redder in age. Occasional on burns and disturbed places throughout the area. 3-5.

7. Medicago

1a. Annual with yellow flowers 2-4 mm long	
2a. Racemes many-flowered; pod unarmed, 1-seeded, black when ripe	1. **M. lupulina**
2b. Racemes with 1-5 flowers; pod spiny or tuberculate, pale brown when ripe	2. **M. polymorpha**
1b. Deep-rooted perennial with purple flowers ca 8 mm long	3. **M. sativa**

1. ***M. lupulina** L. Black Medic. Procumbent annual; flowers yellow; pods 2 mm wide, reniform, coiled in ca 1 complete turn, 1-seeded. Infrequent weed of lawns, waste places and cultivated areas near West Los Angeles and Santa Monica. 4-7. Native of western Eurasia and North Africa.

2. ***M. polymorpha** L. Bur-Clover. Procumbent annual; flowers yellow; pods 4-6 mm across, flat, in a spiral of 1.5 to 4 turns, several seeded. Common in grassy places and disturbed soil throughout. 2-7. Native of western Eurasia and North Africa. A form that lacks spines on the fruits, f. **tuberculata** (Gren. & Godr.) Shinners [var. **confinis** (Koch) Burnat] is occasional; intermediates also occur.

3. ***M. sativa** L. Alfalfa. Erect, bushy perennial; flowers purple. Common in waste ground along roads at low elevations throughout. 4-10. Native of Mediterranean region, widely cultivated.

8. **Melilotus** Mill. Sweet-Clover

1a. Flowers white, 4-6 mm long — 1. **M. albus**
1b. Flowers yellow, 2-3 mm long — 2. **M. indicus**

1. ***M. albus** Medic. Annual or biennial herb, up to 1.5 m tall; keel sometimes tinged with yellow. Disturbed places throughout the area below 2000 ft. 4-9. Eurasia.

2. ***M. indicus** (L.) All. Annual or biennial herb, up to 8 dm tall. Disturbed places throughout the area below 2000 ft. 4-9. Eurasia.

9. **Pickeringia** Nutt. Chaparral-Pea

1. **P. montana** Nutt. ex T. & G. subsp. **montana**. Thorny shrub, up to 2 m tall; flowers purple. Chaparral in the western part of the mountains above 1000 ft; Saddle Peak Area, crest east of Castro Peak, Boney Mountain, Los Alisos Canyon. 4-5.

10. **Psoralea** L.

1a. Corolla violet or purplish; calyx teeth very unequal, the lower lobe equal to or longer than the corolla; stems more than 1 m tall — 1. **P. macrostachya**
1b. Corolla whitish with purple tipped keel; calyx teeth subequal; stems less than 1 m tall — 2. **P. physodes**

1. **P. macrostachya** DC. Erect stemmed perennial; petals violet or purple. Colonial along canyon streams in shade, at low elevations, infrequent; from Malibu Creek westward. 5-10.

2. **P. physodes** Dougl. ex Hook. California-Tea. Perennial from creeping rootstocks; petals whitish with purple tipped keel. Rare and colonial in dry places protected by brush at low elevations away from the coast; Stone Canyon; upper drainage of Malibu Creek. 5-6.

11. **Spartium** L. Spanish-Broom

1. ***S. junceum** L. Shrub, to 3 m tall; flowers 2-2.5 cm long, yellow. Naturalized on dry slopes in the eastern half of the mountains. 4-6. Mediterranean.

12. **Trifolium** L. Clover

1a. Heads without an involucre or bracts subtending heads
  2a. Perennials with stems creeping and rooting at nodes — 9. **T. repens**
  2b. Annuals, usually erect
    3a. Flowers pedicellate, reflexed in age; calyx glabrous
      4a. Calyx teeth denticulate — 2. **T. ciliolatum**
      4b. Calyx teeth entire — 5. **T. gracilentum**
    3b. Flowers sessile, not reflexed in age; plants villous all over
      5a. Corolla ca 1 cm long, crimson, longer than the calyx; heads more or less cylindrical — 6. **T. incarnatum**
      5b. Corolla 6-7 mm long, dull purple, equal to or shorter than the calyx; heads subglobose — 1. **T. albopurpureum**
1b. Heads with an involucre or bracts subtending heads
  6a. Involucral bracts distinct; corollas conspicuously inflated in age
    7a. Flowers 12-25 mm long, yellowish — 4. **T. fucatum**
    7b. Flowers 5-8 mm long, purple — 3. **T. depauperatum**

6b. Corollas not conspicuously inflated in age
  8a. Involucres covered with long, loose pubescence, bowl-shaped — 7. **T. microcephalum**
  8b. Involucres glabrous or nearly so, but often ciliate on or near margins, flat
    9a. Plants viscid pubescent, especially on the peduncles, and clammy to the touch, growing in wet places — 8. **T. obtusiflorum**
    9b. Plants glabrous or nearly so, not glandular
      10a. Corollas 12-15 mm long; calyx teeth abruptly narrowed to an awnlike tip, usually with one or two teeth on either side of the awn — 10. **T. tridentatum**
      10b. Corollas 5-8 mm long; calyx teeth gradually narrowed to a simple tip — 11. **T. variegatum**

1. **T. albopurpureum** T. & G. Annual; heads 0.5-1.5 cm long; flowers purple. Rare, shallow soil in grassland; Triunfo Pass, 2100 ft; Lake Eleanor, 1000 ft. 4.

2. **T. ciliolatum** Benth. Glabrous annual; heads mostly 1-2 cm long; corollas pinkish. Occasional in grassy fields and openings away from the coast, upper Malibu Creek eastward, at relatively low elevations. 4-5.

3. **T. depauperatum** Desv. [**T. amplectens** T. & G.]. Slender annual with numerous decumbent stems from the base; petals whitish to purple. Grassy slope; Benedict Canyon. 3-4.

4. **T. fucatum** Lindl. Annual; stems stout, fistulose; corollas 20-25 mm long when inflated in age. Reported from Santa Monica Mountains by Munz (1935, p 255); Elysian Park, **Davidson**. Trippet Ranch, Topanga State Park.

5. **T. gracilentum** T. & G. Subglabrous annual; heads mostly 6-10 mm long; corollas purplish pink. Rare in grassy openings at relatively low elevations, north slope of western half of the range. 4-5.

6. ***T. incarnatum** L. Crimson Clover. Annual; heads 3-7 cm long; petals crimson. Locally sown and perhaps established in southern oak woodland near Lake Sherwood. 5-6. Native of Mediterranean.

7. **T. microcephalum** Pursh. Sparsely villous slender annual; corollas rose, ca 6 mm long. Vernally moist slopes above 2000 ft; Saddle Peak, Little Sycamore Canyon. 5.

8. **T. obtusiflorum** Hook. Robust annual; corolla pale with prominent dark purple central spot. Infrequent and local in wet places along streams; near Lake Sherwood, Los Alisos Canyon. 5-7.

9. ***T. repens** L. White Clover. Glabrous perennial; heads axillary, the peduncles 5-20 cm long; flowers ca 1 cm long; flowers white to pale pink; pedicels deflexed after flowering. Fairly common weed about lawns and near cultivation throughout. 4-7. Native of Eurasia and North Africa.

10. **T. tridentatum** Lindl. Tomcat Clover. Glabrous annual; petals red-purple. Occasional on grassy slopes throughout. 3-5.

11. **T. variegatum** T. & G. Glabrous annual; petals purple with white tips. Along stream near Lake Sherwood. 5-6.

13. **Vicia** L. Vetch

1a. Flowers borne in clusters on an elongate peduncle
  2a. Flowers ca 5 mm long — 3. **V. exigua**
  2b. Flowers more than 1 cm long
    3a. Flowers numerous, usually at least 10 in a cluster, bright purplish-blue
      4a. Pubescence erect, villous — 5. **V. villosa**
      4b. Pubescence appressed, strigose — 2. **V. dasycarpa**
    3b. Flowers few, mostly 2-7 in a cluster, lavender or dull purple — 1. **V. americana**
1b. Flowers solitary or paired in the axils of the leaves, subsessile — 4. **V. sativa**

1. **V. americana** Muhl. subsp. **americana** [**V. americana** subsp. **oregana** (Nutt.) Abrams]. Scrambling, sparsely pubescent perennial; petals purplish. Rare on protected slopes of lower elevations; Westwood, lower Malibu Creek. 4-5.

2. ***V. dasycarpa** Ten. Rank annual; corollas ca 1.5 cm long, purple-violet; calyx teeth subglabrous. Infrequent weed of field borders and waste places in western half of the area. Sown as a cover crop. 5-6. Native of southern Europe and north Africa.

3. **V. exigua** Nutt. [**V. hassei** S. Wats.]. Slender annual; flowers mostly whitish, may be purplish. Rare, Monte Nido and reported from the vicinity of Santa Monica. 4-5.

4. ***V. sativa** L. Spring Vetch. Rank annual; leaflets truncate, mucronate; corollas 1.5-2.3 cm long, violet-purple. Rare weed of waste ground, pastures, or field borders in western half of the area. 4-5. Probably native of western Asia.

5. ***V. villosa** Roth. Winter Vetch. Rank annual; calyx teeth villous; corollas ca 1.5 cm long, violet and white. Sown as a cover crop and rarely established, near cultivated fields, Calabasas. 5-6. Native of Europe.

FAGACEAE

1. **Quercus** L. Oak

1a. Involucre (acorn cup) scales thin, papery; acorn shell tomentose on inner surface; leaves elliptic to ovate, coarsely dentate to entire at margin, if entire then the apex acute and the lower surface glabrous
  2a. Leaves convex above, elliptic, coarsely dentate, usually with a tuft of hairs in the vein-axils on lower surface; acorns maturing the first autumn; tree in moist areas throughout 1. **Q. agrifolia**
  2b. Leaves flat, ovate, dentate to entire, glabrous on lower surface; acorns maturing the second autumn; shrub in chaparral, rare 4. **Q. wislizenii**
1b. Involucre scales thick and warty; acorn shell glabrous to sparsely hairy on inner surface; mature leaves oblong to elliptic, parted to nearly entire, if nearly entire then the margin at least sinuous, obtuse at apex, pubescent on lower surface
  3a. Large trees; leaves usually 5-10 cm long, parted or cleft, with rounded lobes, not conspicuously toothed 3. **Q. lobata**
  3b. Shrubs; leaves usually 2-5 cm long, entire to cleft; leaf lobes, when present, with prominent teeth 2. **Q. dumosa**

1. **Q. agrifolia** Nee. Coast Live Oak. Evergreen tree usually 10-20 m tall with rounded crown; acorns ca 3 cm long, pointed at acute apex. Common in moist canyons and on deeper soils througout. 2-4.

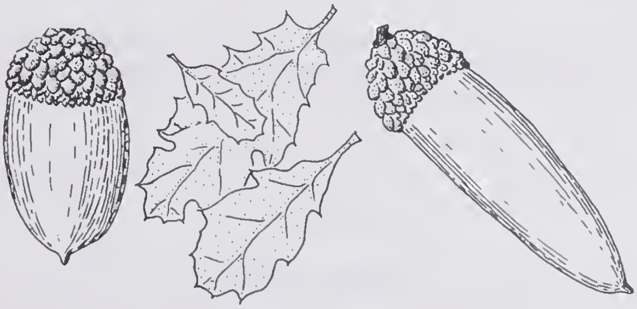

Figure 19. Quercus dumosa

2. **Q. dumosa** Nutt. Scrub Oak. Fig. 19. Evergreen shrub usually 2-3 m tall, acorns ca 2 cm long, rounded or blunt at apex, sparsely pubescent on inner surface of shell. Leaves highly variable often entire to parted and toothed on the same individual. In chaparral away from the ocean throughout the mountains. 3-4.

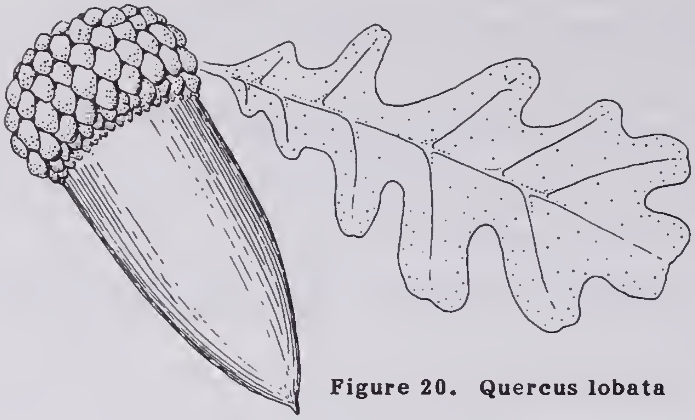

Figure 20. Quercus lobata

3. **Q. lobata** Nee. Valley Oak. Fig. 20. Large, deciduous tree up to 30 m tall, rounded and open crown with pendulous branches; acorns ca 4 cm long, obtuse at apex; glabrous on inner surface of shell. Deep soils in the broader valleys on inland side of the mountains from Encino westward. 3-4. Abrams (1904; p 105) reported a single tree from near Santa Monica, **Hasse.**

4. **Q. wislizenii** A. DC. Interior Live Oak. Evergreen shrub; acorns similar to those of **Q. agrifolia.** Rare; Triunfo Lookout, Cold Creek Canyon, Saddle Peak, Santa Ynez Canyon. 3-4.

FRANKENIACEAE

1. Frankenia L.

1. **F. grandifolia** Chem. & Schlecht var. **grandifolia.** [**F. salina** (Mol.) I. M. Jtn.]. Herbaceous perennial or suffrutescent shrub, 1-3 dm tall, sometimes slightly woody at base; flowers ca 1 cm long; petals rosy-purple. Coastal salt marshes from Mugu Lagoon to mouth of Malibu Creek. 6-10.

GARRYACEAE

1. Garrya Dougl. Silktassel

1. **G. veatchii** Kell. Shrub up to 3.5 m tall; leaves leathery, 3-7 cm long, acute at apex, glabrous above and with a dense felt-like pubescence below. Chaparral away from the immediate coast; Upper Malibu Creek, Saddle Peak, Topanga Canyon. 12-3. These plants resemble **G. elliptica** in having slightly undulate leaves but their acute leaves place them in **G. veatchii.** These two species are largely allopatric, **G. elliptica** occurring in the Coast Ranges from Oregon to Santa Barbara Co., and **G. veatchii,** from San Luis Obispo Co. south to Baja California. The Santa Monica Mountain specimens appear intermediate and suggest that **G. elliptica** and **G. veatchii** might best be regarded as geographical races of a single species.

GENTIANACEAE

1. Centaurium Hill.

1. **C. venustum** (Gray) Robins. Canchalagua. Erect, glabrous, corymbosely branched annual up to 4 dm tall; leaves opposite, sessile, ovate to oblong, 1-2.5 cm long; flowers on pedicels 2-25 mm long; corolla rose with red spots in the white throat; stigma fan shaped. Occasional in open areas of chaparral or coastal sage scrub in the central portion of the range below 2000 ft. 6-7.

GERANIACEAE Geranium Family

1a. Leaves pinnately lobed or divided	1. **Erodium**
1b. Leaves palmately lobed or divided	2. **Geranium**

1. **Erodium** L'Her. Storksbill, Filaree

1a. Leaves reniform-cordate, shallowly lobed	4. **E. macrophyllum**
1b. Leaves elongate, not cordate, deeply lobed or divided	
2a. Leaves deeply divided; beaks of fruits 6-12 cm long	
3a. Beaks 6-9 cm long; concavities at top of fruit subtended by a single fold; upper part of fruit pubescent	2. **E. brachycarpum**
3b. Beaks 9-12 cm long; concavities at top of fruit subtended by two folds; top of fruit glabrous	1. **E. botrys**
2b. Leaves pinnately compound; beaks of fruit 2-4 cm long	
4a. Stipules and bracts obtuse; leaflets coarsely toothed	5. **E. moschatum**
4b. Stipules and bracts acute or acuminate; leaflets deeply divided	3. **E. cicutarium**

1. ***E. botrys** (Cav.) Bertol. Semiprostrate to suberect annual; petals lavender, ca 15 mm long. Rare weed of waste ground, Santa Monica. 4-6. Native of the Mediterranean region.

2. ***E. brachycarpum** (Godr.) Thellung. [**E. obtusiplicatum** (Maire, Weiller & Wilcz.) J. T. Howell]. Coarse sprawling annual; petals rose-purple, 8-11 mm long. 3-5. Native of North Africa. Naturalized in waste ground, West Los Angeles.

3. ***E. cicutarium** (L.) L'Her. Decumbent annual; petals rose-lavender, 5-7 mm long. Common throughout in open waste places and on grassy slopes. 1-5. Native of Eurasia and North Africa.

4. **E. macrophyllum** H. & A. Erect annual with broad nearly entire leaves; petals white to rose-red or purple, 10-16 mm long. Reported from Santa Monica Mountains by Munz (1936, p 275).

5. ***E. moschatum** (L.) L'Her. Annual with coarse, thick, decumbent stems; petals ca 8 mm long, rose-purple. Occasional at low elevations througout in waste ground and along roadsides. 2-5. Native of Europe and Mediterranean region.

2. **Geranium** L. Cranesbill

1a. Sepals with a prominent awn at tip	1. **G. carolinianum**
1b. Sepals acute	
2a. Leaves alternate; petals longer than sepals, emarginate	2. **G. molle**
2b. Leaves usually opposite; petals shorter than sepals, not emarginate	3. **G. rotundifolium**

1. **G. carolinianum** L. Erect annual, 1-4 dm tall, densely short-hairy; petals pinkish; carpels covered with long ascending unequal hairs. Scattered throughout at low elevations, often on shaded slopes. 3-6.

2. ***G. molle** L. Erect, pilose annual; petals rose purple; carpels glabrous; seeds smooth. Locally established on shaded slopes near gardens, vicinity of West Los Angeles and Santa Monica. 3-5. Native of Eurasia and North Africa.

3. ***G. rotundifolium** L. Round-leaved Cranesbill. Annual, 10-20 cm tall, short hairy; petals pink; seeds distinctly pitted; upper Rustic, lower Temescal canyons. Native of Eurasia and north Africa.

HYDROPHYLLACEAE Waterleaf Family

1a. Plants distinctly shrubby	2. **Eriodictyon**
1b. Plants herbaceous or suffrutescent at base	
2a. Stems with recurved prickles	7. **Pholistoma**
2b. Stems lacking recurved prickles	
3a. Calyx with reflexed appendages in the sinuses	5. **Nemophila**
3b. Calyx lacking appendages in the sinuses	
4a. Ovary 1-celled; herbage viscid, strongly scented	3. **Eucrypta**

4b. Ovary 2-celled by intrusion of the placentae; herbage not viscid and strongly scented.
  5a. Calyx divided 2/3 its length with the tubular base adnate to the ovary; stamens unequal in length; rare in wet, heavy soil — 4. **Nama**
  5b. Calyx divided nearly to base; stamens equal in length
    6a. Corolla yellow, persisting and enclosing the mature capsule — 1. **Emmenanthe**
    6b. Corolla purple, blue, lavender or white, not persisting on mature capsule — 6. **Phacelia**

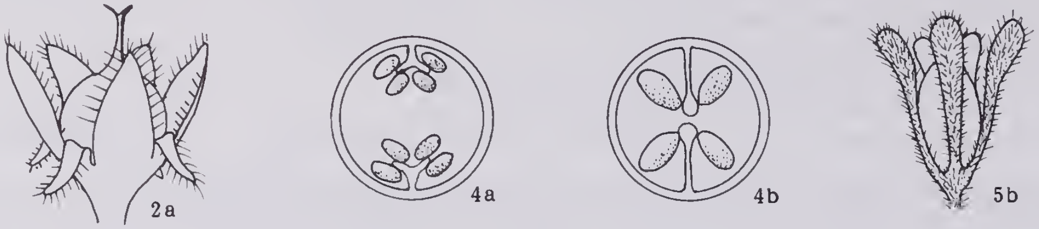

Figure 21. Characteristics of Hydrophyllaceae referred to in key. Numbers refer to leg of key.

1. **Emmenanthe** Benth.

1. **E. penduliflora** Benth. Whispering Bells. Erect annual, branched above, up to 5 dm tall; leaves pinnatifid; flowers pendulous; corollas campanulate, yellowish, ca 1 cm long. Chaparral and southern oak woodland, becoming abundant after burns; throughout. 4-5.

2. **Eriodictyon** Benth. Yerba Santa

1. **E. crassifolium** Benth. Shrub ca 2 m tall, hoary-tomentose; corollas tubular, lavender. In chaparral and coastal sage scrub, particularly in disturbed areas, at higher elevations and on the northern slope of the western portion of the mountains. 4-5.

3. **Eucrypta** Nutt.

1. **E. chrysanthemifolia** (Benth.) Greene var. **chrysanthemifolia.** Erect annual up to 4 dm tall; leaves 2- to 3-pinnatifid; corollas cream or white, campanulate, ca 7 mm across. In chaparral, coastal sage scrub and southern oak woodland, particulary abundant after fire. Throughout the area except for the immediate coast. 2-5.

4. **Nama** L.

1. **N. stenocarpum** A. Gray. Hirsute annual with many decumbent branches 1-3 dm long; leaves oblanceolate, entire, 2-5 cm long; corollas funnelform, 6-7 mm long, pale violet. Rare, on wet heavy soil; Sawtelle, Santa Monica. 3-5.

5. **Nemophila** Nutt. ex Barton

1a. Corollas more than 6 mm across, rotate, blue — 1. **N. menziesii**
1b. Corollas less than 6 mm across, campanulate, white — 2. **N. pedunculata**

1. **N. menziesii** H. & A. subsp. **australis** Brand. Baby Blue-Eyes. Slender diffuse annual 1-3 dm tall; corollas blue, often with black or dark blue dots. Grassy areas under oaks or in chaparral, occasional in the eastern part of the range. 2-6.

2. **N. pedunculata** Dougl. ex Benth. Low diffuse annual 0.2-3 dm tall; corollas white to pale blue; capsules purplish; seeds ant dispersed. Grassy hillsides in southern oak woodland, northern drainage of Malibu Creek. 3-5.

6. **Phacelia** Juss.

1a. Plants perennial	
2a. Divisions of the leaves toothed; longest trichomes on leaves 1.5 mm long; filaments glabrous	11. **P. ramosissima**
2b. Divisions of the leaves entire; longest trichomes on leaves 3 mm long; filaments pubescent	
3a. Corollas cylindrical with lobes incurved after anthesis; sepals 1.5-3 mm wide in flower	7. **P. imbricata**
3b. Corollas campanulate with lobes spreading; sepals 1-1.5 mm wide in flower	5. **P. elegans**
1b. Plants annual	
4a. Leaves compound; leaflets toothed or divided; scales on corolla tube (lateral to the filaments) well developed; capsules with 2-4 seeds	
5a. Calyx lobes 1 cm long in fruit, loosely enveloping the capsule; pustulate bristles present at apex of ovary	2. **P. cicutaria**
5b. Calyx lobes less than 1 cm long in fruit, appressed to capsule; ovary pubescent but without pustulate bristles	
6a. Calyx lobes lanceolate to oblanceolate or obovate	3. **P. distans**
6b. Calyx lobes linear-lanceolate	12. **P. tanacetifolia**
4b. Leaves simple, toothed or pinnatifid at margins; scales lacking or very small (in **P. douglasii**); capsules with 8 to many seeds	
7a. Leaves pinnately cleft to divided	
8a. Pedicels 0.3 cm long in fruit; ovary sparsely hispidulose; seeds transversely corrugated	1. **P. brachyloba**
8b. Pedicels more than 1 cm long in fruit; ovary with hairs 2 mm long at apex; seeds pitted but not transversely corrugated	4. **P. douglasii**
7b. Leaves ovate, margins dentate	
9a. Style cleft 2/3 of it length or less; pedicels in fruit more than 1 cm long; staminal appendages present	
10a. Corollas tubular, somewhat constricted at throat with tube twice as long as the lobes	9. **P. minor**
10b. Corollas open-campanulate to rotate with tube as long as the lobes	
11a. Corollas purple (rarely white); filament appendages hairy	10. **P. parryi**
11b. Corollas white (rarely violet); filament appendages glabrous	8. **P. longipes**
9b. Style cleft 3/4 of its length or more; pedicels in fruit 1 cm long or less; staminal appendages absent	
12a. Corollas 3-4 cm in diameter; style 1.5-2.5 cm long	6. **P. grandiflora**
12b. Corollas 1.5-2.5 cm in diameter; style to 1.5 cm long	13. **P. viscida**

1. **P. brachyloba** (Benth.) A. Gray. Erect annual, up to 6 dm tall; corollas white to pink with yellow tube. Open areas in chaparral, recently burned areas; vicinity of Saddle Peak, Castro Peak. 5-6.

2. **P. cicutaria** Greene var. **hispida** (A. Gray) J. T. Howell. Annual, up to 6 dm tall; leaves and stems hispid and lightly prickly to the touch; corollas pale lavender with markings in the throat. Throughout the mountains; most common in chaparral and often on burns. 3-6.

3. **P. distans** Benth. Annual, up to 6 dm tall; corollas blue. Throughout the mountains below 2000 ft elevation; in southern oak woodland, coastal sage scrub and on oceanic bluffs. 3-6.

4. **P. douglasii** (Benth.) Torr. Annual, up to 4 dm tall; pedicels recurved; corollas blue. Wooded slopes near Topanga. 2-4.

5. **P. elegans** (Greene ex Brand.) J. T. Howell. Perennial, similar to **P. imbricata** but differing in the characteristics given in the key. Margins of southern oak woodland and open rocky slopes in chaparral at higher elevations on the inland slope of the western half of the mountains. 5-6.

6. **P. grandiflora** (Benth.) A. Gray. Subsucculent and coarse annual, up to 1 m tall; corollas violet to bluish. Chaparral, southern oak woodland and coastal sage scrub throughout, becoming

abundant after fires. 2-6.

7. **P. imbricata** Greene. Perennial; stems few, 2-8 dm long, from a woody caudex; leaves mostly basal; corollas white. Shaded margins of southern oak woodland in western half of the mountains on inland slopes. 5-6.

8. **P. longipes** Torr. ex A. Gray. Annual, freely branched from the base, up to 1 m tall; corolla white. Rare, openings in chaparral; Topanga Canyon, Griffith Park. 3-5.

9. **P. minor** (Harv.) Thell. ex F. Zimmerman. Annual, up to 6 dm tall; corollas purple, rarely white. Occasional; scattered in the eastern half of the mountains, especially on burns.

10. **P. parryi** Torr. Erect annual, up to 6 dm tall, usually unbranched at the base; corolla dark purple to violet with pale center. Disturbed areas in chaparral and coastal sage scrub, becoming abundant on burns. Western half of the mountains. 3-5.

11. **P. ramosissima** Dougl. ex Lehm. Perennial; main stems up to 1 m long or more, from a woody crown; corollas white to bluish. Plants from the coastal bluffs at Point Dume have dark blue flowers and the main stems are without glandular trichomes but with long setose-hispid trichomes with pustulate bases; these are referrable to var. **austrolitoralis** Munz. Plants away from the coast have white flowers and gland-tipped trichomes on the main stems; these are var. **suffrutescens** Parry. The latter occurs throughout the area in southern oak woodland, chaparral and along streams, but is somewhat local. 4-9.

12. **P. tanacetifolia** Benth. Annual, up to 1 m tall; densely hispid and prickly to the touch; corollas light blue. In chaparral and southern oak woodland east of Malibu Canyon; often common on burns. 4-5.

13. **P. viscida** (Benth. ex Lindl.) Torr. Annual, up to 7 cm tall; corollas purplish blue or white. In disturbed chaparral and southern oak woodland, occasional becoming locally abundant after fire. Central and eastern parts of the range. 3-5.

7. **Pholistoma** Lilja ex Lindbl.

1a. Petioles of cauline leaves broadly winged, auriculate-clasping; corollas lavender to blue or violet, with conspicuous scales between the anthers	1. **P. auritum**
1b. Petioles of cauline leaves narrowly winged, not auriculate; corollas white or blue, with scales usually narrow or obsolete	2. **P. racemosum**

1. **P. auritum** (Lindl.) Lilja ex Lindbl. Fiesta Flower. Trailing annual with stems 1-12 dm long; leaves pinnately divided; corollas rotate, 1-3 cm across, lavender to purple. Grassy areas in chaparral and southern oak woodland, often becoming abundant after fire; throughout. 3-5.

2. **P. racemosum** (Nutt. ex A. Gray) Const. Like **P. auritum** but stems 2-6 dm long; corollas 0.6-1 cm across, white or sometimes bluish. Shaded slope in southern oak woodland, Little Sycamore Canyon, 1100 feet elevation. Otherwise known only from the Channel Islands and the coast near and south of San Diego. 3-5.

JUGLANDACEAE

1. **Juglans** L. Walnut

1. **J. californica** S. Wats. Small tree 8-10 m tall, frequently with several trunks; leaves pinnately compound 15-30 cm long, leaflets 4-7 cm long. Throughout the area in southern oak woodland or in chaparral on north slopes or otherwise moist situations. 3-4.

LAMIACEAE Mint Family

1a. Calyx with 10 spinescent hooked teeth 3. **Marrubium**
1b. Calyx not as above
  2a. Anther bearing filaments two 6. **Salvia**
  2b. Anther bearing filaments four
    3a. Calyx 2-lipped, the lips entire 8. **Scutellaria**
    3b. Calyx nearly regular with 5 lobes
      4a. Corolla tube broad, ca 10 mm wide; calyx in open flowers 2 cm long; pedicels 2 cm long 2. **Lepechinia**
      4b. Corolla tube narrow, ca 5 mm wide or less; calyx and pedicels less than 1 cm long
        5a. Stamens 2 cm long or longer, twice as long as the corolla 10. **Trichostema**
        5b. Stamens 1 cm long or shorter, scarcely exceeding the corolla
          6a. Corolla strongly 2-lipped
            7a. Upper lip of corolla concave
              8a. Calyx teeth spine-tipped; corolla tube with a ring of hairs within; erect perennials 9. **Stachys**
              8b. Calyx teeth not spine-tipped; corolla tube without a ring of hairs within; plants mosty annual 1. **Lamium**
            7b. Upper lip of corolla plane; plants creeping, rooting at nodes; flowers solitary in leaf axils 7. **Satureja**
          6b. Corollas nearly regular, not strongly 2-lipped
            9a. Flowers in terminal heads 5. **Monardella**
            9b. Flowers in whorls or aggregated into terminal spikes 4. **Mentha**

1. **Lamium** L. Henbit

1. ***L. amplexicaule** L. Annual, sparsely pubescent, stems ± decumbent; leaves broadly ovate to roundish, truncate or cordate at base, coarsely crenate, the lower petioled, the upper not; flowers axillary or in terminal clusters, purple-red. Waste places. 4-9. Native to Europe.

2. **Lepechinia** Willd. Pitcher Sage

1. **L. fragrans** (Greene) Epling. Shrub, ca 1 m tall; corollas white, ca 3 cm long. On moist, higher slopes and in canyons leading to the sea in the western portion of the range and north-facing slope of Boney Mountain into Hidden Valley. 4-5.

3. **Marrubium** L. Horehound

1. ***M. vulgare** L. Shrub usually 5-6 dm tall, woody only at base, leaves and young stems white-wooly; corolla 5-6 mm long, white. Common throughout the area in disturbed places. 4-5 (-10). Native of Europe.

4. **Mentha** L. Mint

1a. Flower whorls well separated and usually subtended by leaves; plants pubescent
  2a. Leaves subtending flower whorls several times longer than flowers, petioled, spreading 1. **M. arvensis**
  2b. Leaves subtending flower whorls only slightly longer than flowers, sessile, deflexed 2. **M. pulegium**
1b. Flower whorls crowded in terminal spikes, subtended by narrow bracts; plants glabrous 3. **M. spicata**

1. **M. arvensis** L. subsp. **haplocalyx** Briq. [**M. a.** var. **villosa** (Benth.) S. R. Stewart]. Mint. Pubescent perennial; calyx teeth triangular, subulate; corolla pinkish to purplish. Wet soil; Malibu Creek drainage, Lake Sherwood. 9-10.

2. ***M. pulegium** L. Pennyroyal. Pubescent perennial; calyx teeth somewhat more hirsute than in **M. arvensis**; corolla lavender. Wet soil along creek, Malibu Canyon. 6-10. Europe.

3. ***M. spicata** L. Spearmint. Glabrous perennial; calyx teeth subulate, ciliate; corolla pale lavender. These plants approach **M. piperita** in having short-petioled rather than sessile leaves. Wet soil, along creek, Malibu Canyon. 8-10. Native of Europe.

5. **Monardella** Benth.

1a. Perennials, woody at base; leaves white tomentose on lower surface	1. **M. hypoleuca**
1b. Annual; leaves puberulent on lower surface	2. **M. lanceolata**

1. **M. hypoleuca** A. Gray. Plants up to 5 dm tall; suffrutescent with creeping rootstocks; corollas white or pale lavender. Malibu and Topanga Canyons under oaks. 6-7.

2. **M. lanceolata** A. Gray. Plants annual, usually 2-3 dm tall; corollas purple. Vicinity of Lake Sherwood and Stokes Canyon in southern oak woodland. 5-6.

6. **Salvia** L. Sage

1a. Annuals; leaves pinnatifid	2. **S. columbariae**
1b. Perennials; leaves crenate	
2a. Herbaceous perennials; corollas dark red to red	5. **S. spathacea**
2b. Shrubs; corollas blue, lavender to white (individual hybrids between the following species occasionally occur where they grow together)	
3a. Corolla tube shorter than lower lip, upper lip small; inflorescence thyrsoid-paniculate	1. **S. apiana**
3b. Corolla tube longer than lower lip, upper lip well developed; flowers in dense glomerules forming an interrupted spike	
4a. Stamens exserted; plant grayish white tomentose throughout; bracts and calyx lobes blunt	3. **S. leucophylla**
4b. Stamens not surpassing the upper lip; plant not grayish white; bracts and calyx lobes cuspidate	4. **S. mellifera**

1. **S. apiana** Jeps. White Sage. Shrub, the lower woody portion ca 1 m tall with the inflorescences reaching a height of 2 m; corolla white or tinged with lavender. Usually in coastal sage scrub but occasionally in chaparral and southern oak woodland throughout but away from the immediate coast. 4-6. Hybrid individuals between **S. apiana** and **S. mellifera** or **S. leucophylla** occur occasionally where populations of the species grow together.

2. **S. columbariae** Benth. Chia. Annual usually 1-5 dm tall; corolla blue, 10-15 mm long. Open banks often in coastal sage scrub throughout, but away from the immediate coast. 4-5.

3. **S. leucophylla** Greene. Shrub 1-1.5 m tall; woody below; corolla pink to rose-lavender. Common throughout the area in coastal sage scrub. 5-7. Hybrid individuals between **S. leucophylla** and **S. mellifera** or **S. apiana** occur occasionally where populations of the species grow together.

4. **S. mellifera** Greene. Black Sage. Shrub 1-1.5 (2) m tall; leaf blades tapered gradually into the short petiole, dark green above, gray below. Corollas blue, pale blue or nearly white. In chaparral and coastal sage scrub throughout the area. 3-6. Hybrid individuals between **S. mellifera** and **S. apiana** or **S. leucophylla** occasionally occur where populations of the two species grow together.

5. **S. spathacea** Greene. Pitcher Sage. Herbaceous perennial usually 2-6 (10) dm tall; lower leaves hastate; bracts of flower whorls usually dark reddish to purplish. In southern oak woodland or in openings in chaparral, often in partial shade, throughout the mountains but below 2000 ft and away from the immediate coast. 3-5.

7. **Satureja** L.

1. **S. douglasii** (Benth.) Briq. Yerba Buena. Trailing, perennial herb; corollas white to purplish, up to 1 cm long. Santa Monica Mountains (Proc. S. Calif. Acad. 1: 23).

8. **Scutellaria** L.

1. **S. tuberosa** Benth. subsp. **tuberosa.** [**S. t.** subsp. **australis** (Jeps.) Epling]. Skullcap. Herbaceous perennial usually 5-10 cm tall, growing from small tuber. Chaparral and southern oak woodland from Boney Ridge eastward away from the coast. 3-5.

9. **Stachys** L. Hedge-Nettle

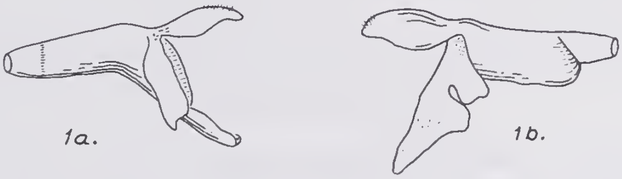

Figure 22. Characteristics of **Stachys** referred to in key.

1a. Calyx only about half to one third as long as corolla tube; corolla not saccate at base but with a ring of hairs opposite the apex of the nutlets and perpendicular to the axis of the corolla tube — 2. **S. bullata**

1b. Calyx nearly as long as corolla tube; corolla saccate with a ring of hairs extending from the sac obliquely and anteriorly across the corolla tube

  2a. Plants densely pubescent with soft hairs, cobwebby on older stems — 1. **S. albens**

  2b. Plants pubescent with straight, stiff hairs, not cobwebby on older stems — 3. **S. rigida**

1. **S. albens** A. Gray. Herbaceous perennial, usually 4-8 dm tall; corollas about 1 cm long, white. In wet areas from Sepulveda Canyon westward below 2000 ft. 5-8.

2. **S. bullata** Benth. Herbaceous perennial, usually 4-6 dm tall; corollas about 1 cm long, lavender. Moist areas below 2000 ft but not on the inland side of the high western half of the range. 3-5.

3. **S. rigida** Nutt. ex Benth. subsp. **quercetorum** (Heller) Epling. Herbaceous perennial, usually 4-6 dm tall; corolla about 1 cm long; rose-purple to lavender. Moist areas from Latigo Canyon eastward but not on the inland side of the high western half of the range. 3-5.

10. **Trichostema** L.

1a. Plants small shrubs; inflorescence with purple wool — 1. **T. lanatum**

1b. Plants annual; inflorescence lacking purple wool — 2. **T. lanceolatum**

1. **T. lanatum** Benth. Wooly Blue-Curls. Shrub, about 1 m tall; leaves linear-lanceolate, usually in axillary fascicles; corolla blue. In chaparral and coastal sage scrub from Mandeville Canyon westward. 3-6.

2. **T. lanceolatum** Benth. Vinegar Weed. Strong scented annual usually 2-4 dm tall; leaves lanceolate; corolla light blue. Occasional in heavy soils from Sepulveda Canyon area westward, below 2000 ft. 8-10.

LAURACEAE Laurel Family

1. **Umbellularia** Nutt. California Bay

1. **U. californica** (H. & A.) Nutt. Pungently aromatic evergreen tree; leaves alternate, entire, coriaceous 5-10 cm long; flowers yellow; sepals deciduous; stamens 9, the inner 3 with 2 stalked orange glands at base; fruit a drupe, becoming dark purple when ripe. Also known as Oregon Myrtle. The wood is hard and takes a fine polish. Along streams and on moist slopes throughout. 12-5.

LENNOACEAE

1. **Pholisma** Nutt. ex Hook.

1. **P. arenarium** Nutt. ex Hook. Fleshy herb without chlorophyll, parasitic on roots of perennial shrubs; leaves reduced to bract-like scales; above ground parts to 2 dm tall; spikes oblong to branched; flowers purplish with white border. The coastal form differs somewhat form the desert plants and has been named **P. paniculatum** Templeton. Sand dunes along the coast, not collected in many years; near Santa Monica, **Hasse** in 1899 (DS).

LINACEAE Flax Family

1. **Hesperolinon** Small

1. **H. micranthum** (A. Gray) Small. [**Linum micranthum** A. Gray]. Annual with many capillary branches, to 3 dm high; leaves alternate, linear, sessile, entire, more or less involute; pedicels filiform, to 15 mm long; petals white, tinged with pink, mostly 2-3 mm long; capsules ovoid. Dry rocky areas in chaparral, more abundant after fire or in disturbed ground; Arroyo Sequit, Triunfo Pass. 4-7.

LOASACEAE

1. **Mentzelia** L.

1. **M. micrantha** (H. & A.) T. & G. Annual, 2-4 (-7) dm tall; petals 3-4 mm long, yellow. Sandy banks and open or disturbed places throughout. 4-5.

LYTHRACEAE Loosestrife Family

1a. Leaves oposite; floral tube campanulate to globular	1. **Ammannia**
1b. Leaves mainly alternate; floral tube cylindric	2. **Lythrum**

1. **Ammannia** L.

1. **A. coccinea** Rottb. Ascending or depressed annuals with angled stems; leaves linear-lanceolate, to 5 cm long, cordate-auriculate at base; flowers clustered in the axils of leaves throughout the plant; calyx 4-angled, 4-toothed; petals 4, purple, deciduous. Occasional in wet places; Los Angeles River at Los Feliz Blvd; Soldier's Home, Santa Monica. 5-10.

2. **Lythrum** L. Loosestrife

1a. Flowers short-pedicelled	1. **L. californicum**
1b. Flowers sessile or nearly so	2. **L. hyssopifolia**

1. **L. californicum** T. & G. Erect, slender perennial herbs, 5-18 dm tall, with angled stems; leaves linear to linear-oblong, to 3 cm long; flowers solitary in the axils of the upper leaves; calyx tube ribbed, 5-6 mm long; petals 4-6, 4-6 mm long, purple. Occasional in damp ground along streams; Topanga Canyon, Cold Creek. 4-10.

2. **L. hyssopifolia** L. Simple or branched glabrous annual or perennial; stems 1-5 dm long, sometimes rooting at nodes; leaves linear to oblong, 6-15 mm long; flowers solitary; petals 1.5-2 mm long; whitish to pale purple. Along margin of pond at Rocky Oaks. 6

MALVACEAE Mallow Family

1a. Plants annual	3. **Malva**
1b. Plants perennial	
2a. Corollas red or orange	5. **Modiola**
2b. Corollas purplish or white	
3a. Plants densely covered with small scurfy scales; petals cream, fading reddish-brown	4. **Malvella**
3b. Plants not covered with scales; petals purplish or lavender	

4a. Shrubs 1-5 m tall; calyx subtended by an involucel of connate or distinct bractlets
5a. Bractlets distinct 2. **Malacothamnus**
5b. Bractlets connate 1. **Lavatera**
4b. Herb from a taproot, 1.5-6 dm tall; calyx subtended by 0 or 1 bractlets 6. **Sidalcea**

Lavatera L. Tree-Mallow

1. ***L. assurgentiflora** Kell. Malva Rosa. Erect shrub 1-4 m tall; stems thick; leaves 5-15 cm wide, 5-7 lobed; petals rose with darker veins, 2.5-4.5 cm long. Cultivated, native of channel islands, occasionally established along the coast.

2. **Malacothamnus** Greene

1. **M. fasciculatus** (Nutt. ex T. & G.) Greene. Shrub mostly 2-5 m tall; leaves sharply angled, more or less densely hairy, mostly 1.5-5 cm long; inflorescence spicate; flowers subsessile in small clusters on short lateral branches; petals lavender, mostly 1-1.5 cm long. Abundant throughout, mostly in disturbed ground as along roads or on burns, expecially in coastal sage scrub. 4-10.

3. **Malva** L. Mallow

1a. Bractlets of involucel ovate to oblong, not more than 3 times as long as wide 1. **M. nicaeensis**
1b. Bractlets linear to nearly so, at least 3 times as long as wide 2. **M. parviflora**

1. ***M. nicaeensis** All. Annual or biennial to over 1 m tall; leaves 5-7 lobed, scarcely cordate, 3-10 cm wide; petals 10-12 mm long, pinkish to blue-violet. Becoming a fairly common weed as at Pt. Dume, **Caplin 88** (SFV). 3-9.

2. ***M. parviflora** L. Cheeseweed. Rank annual, up to 1 m tall; leaves roundish, 3-12 cm across; petals ca 5 mm long, white. Common in waste or disturbed ground and along roadsides at low elevations throughout. 1-12. Native of the Mediterranean region.

4. **Malvella** Jaubert & Spach

1. **M. leprosa** (Ortega) Krapov. [**Sida leprosa** Ortega, **S. hederacea** (Dougl.) T. & G.]. Alkali Mallow. Perennial, stems sprawling, densely hairy; leaves mostly 2-4 cm across; petals ca 10 mm long, yellowish. Occasional in low sandy ground, north of western half of the mountains; Santa Monica. 5-10.

5. **Modiola** Moench

1. ***M. caroliniana** (L.) G. Don. Sprawling, hairy perennial; petals 5-8 mm long, brick red to orange; calyx enlarging in fruit; carpels hirsute. Occasional weed in lawns and waste places, Los Angeles and Santa Monica. 4-8. Native of tropical America.

6. **Sidalcea** A. Gray

1. **S. malvaeflora** (DC.) A. Gray ex Benth. subsp. **sparsifolia** C. L. Hitchc. Dioecious perennial herb; stems mostly 3-5 dm long; leaves deeply divided, mostly basal; pistillate flowers smaller and darker than the staminate ones; petals pinkish-rose, 1-2.5 cm long. Scattered along north slope of the mountains from Malibu Creek west. 3-6. Our material is referable to var. **stellata**. **S. malvaeflora** subsp. **malvaeflora** occurred, at least formerly, on coastal bluffs and in coastal sage scrub near Tapia Park and in the Los Angeles basin. Its stems are densely stellate pubescent below, those of subsp. **sparsifolia** are sparsely hirsute with simple or once forked hairs.

MARTYNIACEAE Unicorn-Plant Family

1. **Proboscidea** Keller in Schmidel

1. ***P. louisianica** (P. Mill.) Thell. Spreading annual; corolla dull white or yellowish, mottled or blotched with red-purple; fruit woody, body 6-10 cm long with two long, curved horns 8-20 cm long. Rare; in dry river bottom; Calleguas River near Camarillo. 6-8. Occasional escape from cultivation. The first edition of this flora listed this species as **P. parviflora** (Woot.) Woot. & Standl., a native of the southwestern deserts. Apparently no vouchers exist to verify is identification and recent attempts to locate this species were unsuccessful. Considering that **P. louisianica** is commonly cultivated, our populations are probably that species.

MYRICACEAE

1. **Myrica** L.

1. **M. californica** Cham. California Wax-Myrtle. Shrub 2-4 m tall; leaves simple, oblanceolate, ca 6-10 cm long; fruit brown-purple. Presumably in tangled streamside vegetation; Santa Monica Canyon. 3-4.

MYRTACEAE Myrtle Family

1. **Eucalyptus** L'Her. Gum Tree

1 ***E. globulus** Labill. Blue Gum. Large tree with shedding bark; leaves 1-2 dm long, glaucous; flowers white, solitary in axils; stamens many; fruits hard, angular, thick-walled capsules. Occasional as individual trees or small groves throughout the area. Most of the individuals have been planted but some natural reproduction by seed probably occurs in relatively moist situations. 12-5. Native of southeastern Australia and Tasmania.

NYCTAGINACEAE Four-O'Clock Family

1a. Inflorescence umbellate, without an involucre; perianth funnel-shaped; fruit not winged	1. **Abronia**
1b. Inflorescence of single, campanulate flowers, subtended by a calyx-like involucre; fruit not winged	2. **Mirabilis**

1. **Abronia** Juss. Sand-Verbena

1a. Perianth dark reddish or purplish; plants mounded	1. **A. maritima**
1b. Perianth light rose-purple to white; plants prostrate	2. **A. umbellata**

1. **A. maritima** Nutt. ex S. Wats. Glandular-pubescent perennial; leaves thick, succulent; perianth 10-14 mm long. Local colonies along the coast, coastal strand; from Point Dume west. 3-11.

2. **A. umbellata** Lam. Less succulent and more sprawling than the preceding; perianth 12-20 mm long. Coastal strand along the entire coast. 3-11.

2. **Mirabilis** L. Four O'Clock

1. **M. californica** A. Gray var. **californica**. [**M. laevis** (Benth.) Curran, **Oxybaphus laevis** Benth.]. Low but often woody at base; leaves subcordate, mostly 1-2 cm long; perianth 6-8 mm long, magenta or lavender to white, opening in the afternoon; stamens long exserted. Common throughout on rocky slopes at low elevations, often in coastal sage scrub. 3-5.

NYMPHAEACEAE Water-Lily Family

1. **Nuphar** Sm.

1. ***N. luteum** (L.) Sibthorp & Sm. subsp. **polysepalum** (Engelm.) E. O. Beal. [**N. polysepalum** Engelm.]. Perennial, aquatic herb with thick rhizomes; leaf blades oval to circular, notched to the long petiole on one side, floating or raised above the surface; flowers yellow, on long peduncles and usually raised above the water surface. Shallow water of lakes and slow moving streams; Malibu Lake. 5-8. Native of temperate western North America; in coastal California south to San Luis Obispo Co.

OLEACEAE Olive Family

1. **Fraxinus** L. Ash

1a. Petals 2, ca 5 mm long; style entire to obscurely lobed; samara broadly winged to base	1. **F. dipetala**
1b. Petals lacking; style 2-lobed; samara terete and not winged toward base	2. **F. velutina**

1. **F. dipetala** H. & A. Large shrub or small tree; leaves pinnately compound, usually 7-12 cm long; flowers bisexual. Moist areas on north slopes in chaparral, found only on the inland side of the high central and western portion of the range. 2-4.

2. **F. velutina** Torr. Small to medium sized dioecious tree; leaves pinnately compound, rarely reduced to only the terminal leaflet. Along streams or washes on the inland side of the high central and western portion of the range. Ours is sometimes treated as var. **coriacea** (S. Wats.) Rehd. 3-5.

ONAGRACEAE Evening-Primrose Family

1a. Petals 5, yellow	5. **Ludwigia**
1b. Petals 4	
2a. Seeds with a tuft of long hairs at one end	4. **Epilobium**
2b. Seeds lacking tuft of hairs	
3a. Anthers attached near base; petals lavender, rose, or purplish (whitish if **C. epilobioides**)	
4a. Sepals ca 2 mm long	1. **Boisduvalia**
4b. Sepals at least 6 mm long	3. **Clarkia**
3b. Anthers attached near middle; petals yellow or white	
5a. Stigma deeply 4-lobed	6. **Oenothera**
5b. Stigma capitate	2. **Camissonia**

1. **Boisduvalia** Sprach.

1. **B. glabella** (Nutt.) Walp. Erect annual ca 1-3 dm tall; leaves ovate, mostly about 1 cm long, serrulate, crowded; flowers often cleistogamous, petals up to ca 4 mm long, purplish. Vernally moist flats, Sawtelle, Santa Monica. Extinct. 5-6.

2. **Camissonia** Link

1a. Petals white	2. **C. boothii**
1b. Petals yellow	
2a. Suffrutescent perennials with densely white-hairy leaves	4. **C. cheiranthifolia**
2b. Annuals	
3a. Plants erect and virgate; capsules long, straight and sharply deflexed	3. **C. californica**
3b. Plants spreading or branched; capsules not straight and sharply deflexed	
4a. Petals 8-14 mm long; stigma elevated above anthers at anthesis	1. **C. bistorta**

4b. Petals shorter; stigma surrounded by anthers at anthesis

5a. Leaves linear, less than 2 mm wide; capsules terete 10. **C. strigulosa**

5b. Leaves broader; capsules often square in cross section, at least when dry

6a. Capsules markedly quadrangular in cross section, 1.8-2.2 mm thick 8. **C. lewisii**

6b. Capsules not markedly quadrangular in cross section, at least in living material, 0.75-1.2 (-1.8) mm thick

7a. Upper leaves evidently petiolate, attenuate at base; capsule usually more contorted; plants subglabrous to strigulose, often reddish 6. **C. ignota**

7b. Upper leaves usually not evidently petiolate, rounded or truncate at base; capsule straight to coiled once or twice; plants strigulose to villous

8a. Capsules 0.75-0.9 mm thick; upper leaves narrowly ovate; plants erect 5. **C. hirtella**

8b. Capsules 0.9-1.2 (-1.8) mm thick; upper leaves narrowly lanceolate to narrowly ovate; plants erect or decumbent

9a. Plants with decumbent branches from the basal rosette; upper leaves usually narrowly lanceolate; short glandular trichomes usually absent in inflorescence 9. **C. micrantha**

9b. Plants erect; upper leaves lanceolate or narrowly ovate; short glandular trichomes almost always present in inflorescence 7. **C. intermedia**

1. **C. bistorta** (Nutt. ex T. & G.) Raven. [**Oenothera bistorta** Nutt. ex T. & G.]. Annual; branches spreading from a central rosette; petals yellow with red dots near the base; capsules slender, covered with long hairs. Common on sandy flats, Point Dume and scattered in grassy openings in woodland or chaparral elsewhere. 3-6.

2. **C. boothii** (Dougl. ex Lehm.) Raven subsp. **decorticans** (H. & A.) Raven. [**Oenothera decorticans** (H. & A.) Greene]. Erect, fleshy annual with dense clusters of white flowers opening at sunset; petals ca 0.5 cm long. Open banks and flats, Griffith Park; rare. 4-5.

3. **C. californica** (Nutt. ex T. & G.) Raven. [**Oenothera leptocarpa** Greene]. Erect annual, to 1.5 m tall; petals 6-14 mm long, yellow or orange often with reddish spots near base; hypanthium lined with orange within. Occasional throughout in disturbed soil, various plant associations. 4-5.

4. **C. cheiranthifolia** (Hornem. ex Spreng.) Raimann subsp. **suffruticosa** (S. Wats.) Raven. [**Oenothera cheiranthifolia** Hornem. ex Spreng. var. **suffruticosa** (S. Wats.) Munz]. Bushy perennial; leaves densely-set, ovate, mostly 1-3 cm long; petals 1-2.5 cm long, bright yellow. Dunes and beaches along the entire coast, common. 3-7.

5. **C. hirtella** (Greene) Raven. Erect annual, generally similar to **C. micrantha**, with one or more ascending branches from the basal rosette; petals 2-9 mm long. Throughout the mountains. 3-5. (n=7).

6. **C. ignota** (Jeps.) Raven. Erect annual often subsucculent and reddish tinged, similar to **C. micrantha**, with one or more ascending branches from the basal rosette; petals 4-8 mm long. Rare; Boney Ridge, Carbon Canyon. (n=7)

7. **C. intermedia** Raven. Erect, densely villous annual, similar to **C. micrantha**, with several erect branches from a basal rosette; upper leaves broader; inflorescence with glandular and nonglandular hairs. Common throughout. 4-6. (n=14).

8. **C. lewisii** Raven. Villous annual similar to **C. micrantha**, with several decumbent branches from basal rosette; capsules square in cross section, 1-coiled. Rare; Point Dume. (n=7).

9. **C. micrantha** (Hornem. ex Spreng.) Raven. [**Oenothera micrantha** Hornem. ex Spreng.]. Annual ± densely villous, with sprawling branches to 60 cm long from a basal rosette; petals yellow, sometimes red dotted; capsule subterete in living material, ± quadrangular in dried material, straight or curved to a complete coil. Rare; Point Dume. (n=7).

10. **C. strigulosa** (Fisch. & Mey.) Raven. [**C. contorta** (Dougl.) Kearny. [**C. dentata** sensu Munz; **Oenothera contorta** Dougl. var. **strigulosa** (Fisch. & Mey.) Munz]. Bushy annuals with many branches from the base; leaves narrow, crowded; petals ca 3 mm long, yellow. Santa Monica Mountains, **Abrams** (DS, POM). 4-6.

3. Clarkia Pursh

1a. Flowers white to cream-colored, fading pink; petals 5-10 mm long 3. **C. epilobioides**
1b. Flowers rose-purple
  2a. Petals conspicuously clawed at base; capsules covered with long spreading hairs 5. **C. unguiculata**
  2b. Petals fan-shaped; capsules not covered with long spreading hairs
    3a. Inflorescence axis and buds erect; petals 6-14 mm long, often with a dark splotch in the center 4. **C. purpurea**
    3b. Either inflorescence axis or the individual buds deflexed; petals 1-3.5 cm long, without a dark central splotch
      4a. Inflorescence axis erect, the individual buds sharply deflexed 1. **C. bottae**
      4b. Inflorescence axis nodding, the individual buds not deflexed 2. **C. cylindrica**

1. **C. bottae** (Sprach) Lewis & Lewis. [**C. deflexa** Jeps.) Lewis & Lewis]. Stout annual up to 1 m tall; sepals united and deflexed to one side at anthesis; petals lavender to pinkish-lavender, mostly white toward base, often flecked with red-purple. Throughout on open slopes, especially in coastal sage scrub, below 2000 ft. 4-6.

2. **C. cylindrica** (Jeps.) Lewis & Lewis. Annual, up to 5 dm tall; leaves narrow; sepals united and deflexed to one side at anthesis; petals purple to pinkish-lavender, shading to white near middle, usually flecked with red-purple with a bright red-purple basal spot. Scattered at low elevations in grassy open spots in coastal sage scrub and southern oak woodland, away from the coast. 4-6.

3. **C. epilobioides** (Nutt.) Nels. & Macbr. [**Godetia epilobioides** (Nutt.) S. Wats.]. Slender annual; axis of inflorescence nodding; individual buds pendulous; sepals united or in pairs at anthesis; petals white to cream-colored. Scattered on partly shaded slopes in southern oak woodland away from the immediate coast; Sepulveda Canyon westward. 4-5.

4. **C. purpurea** (Curt.) Nels. & Macbr. subsp. **quadrivulnera** (Dougl.) Lewis & Lewis. Erect annual; sepals separate at anthesis; petals lavender or purple, often deep red. Occasional on open grassy slopes and flats, often in southern oak woodland, throughout; up to 2300 ft elevation. 4-6.

5. **C. unguiculata** Lindl. [**C. elegans** Dougl.]. Erect stout annual; rachis of inflorescence erect; buds deflexed; sepals separate at anthesis; petals widely spreading, lavender-pink to salmon or purplish or dark red-purple; outer stamens orange-red. Frequent on open slopes, especially in southern oak woodland, away from the coast, from the drainage of Malibu Creek to Franklin Canyon. 4-6.

4. Epilobium L.

1a. Shrub; flowers tubular, red 1. **E. canum**
1b. Herb; flowers not red
  2a. Perennial of moist places 2. **E. ciliatum**
  2b. Annual of dry places 3. **E. brachycarpum**

1. **E. canum** (Greene) Raven subsp. **canum.** [**Zauschneria cana** Greene]. California Fuchsia. Shrub mostly ca 5 dm tall; leaves filiform, to 2 mm wide, gray-pubescent, densely clustered; flowers 2.5-3.5 cm long. Widespread and fairly common, usually in coastal sage scrub, southern slope of the mountains and eastern end from Saddle Peak (at 2450 ft elevation) eastward; n=15. 7-11.

E. canum subsp. **angustifolium** (Keck) Raven [**Zauschneria californica** Presl. subsp. **californica**] similar to preceeding, but leaves narrowly lanceolate, 2.5-6 mm wide, greener; flowers 3-4 cm long. Common about the edges of chaparral and southern oak woodland, rarer in coatal sage scrub, from

Brown [Beverly Glen] Canyon west; not on the immediate coast; n=30. 7-11.

2. **E. ciliatum** Raf. subsp. **ciliatum**. [**E. adenocaulon** Hausskn. var. **parishii** (Trel.) Munz]. Slender perennial herb, up to 1 m tall; leaves lanceolate or narrowly ovate, short stalked, serrulate, mostly 2-5 cm long; flowers 3-4 mm long; petals white or pinkish; stigma clavate; capsules slender, ca 3-6 cm long. Scattered throughout in wet places at low elevations. 6-10.

3. **E. brachycarpum** Presl. [**E. paniculatum** Nutt.]. Erect annual with bark peeling off older stems in strips; leaves narrowly lanceolate, sharp pointed; flowers and capsules similar to **E. ciliatum** but stigma irregularly 4-cleft. Rare on dry slopes in southern oak woodland, north slope of west end of the range. 6-9.

5. **Ludwigia** L.

1. **L. peploides** (H.B.K.) Raven subsp. **peploides**. [**Jussiaea repens** L. var. **peploides** (H.B.K.) Griseb.]. Perennial herb, often floating in water with spongy white parenchymatous roots arising from submerged portions; leaves shiny, mostly 3-6 cm long and 1-1.5 cm wide, lanceolate; petals bright yellow, ca 1 cm long; capsules ca 2 cm long, seeds firmly embedded in tough chunks of endocarp. Locally abundant in lakes or marshy places away from the coast. 5-10.

6. **Oenothera** L. Evening-Primrose

1a. Petals white	1. **O. californica**
1b. Petals yellow	2. **O. elata**

1. **O. californica** (S. Wats.) S. Wats. Spreading perennial herb; leaves sinuate at margin, usually 2-4 cm long; flowers open at sunset; petals 2-3 cm long, white. Sandy soil along the Los Angeles River near Griffith Park; rare. 5-6.

2. **O. elata** H.B.K. subsp. **hirsutisissima** (A. Gray ex S. Wats.) Dietrich. [**O. hookeri** T. & G. subsp. **grisea** (Bartlett) Munz]. Erect, freely branched perennial herb up to 2.5 m tall; leaves entire, 6-12 cm long; flowers open at sunset; petals 2.5-4.5 cm long, yellow. Rare, in moist places; west fork of Sequit Canyon. 6-8.

OXALIDACEAE Oxalis Family

1. **Oxalis** L.

1a. Petals rose-purple	4. **O. rubra**
1b. Petals yellow	
2a. All leaves basal; underground bulblets present; petals 1.5-2.5 cm long	3. **O. pes-caprae**
2b. Some leaves on stems; bulblets absent; petals 0.4-1.2 cm long	
3a. Plants creeping and rooting at nodes	2. **O. corniculata**
3b. Plants tufted, erect from a stout taproot	1. **O. albicans**

1. **O. albicans** Knuth. subsp. **californica** (Abrams) Eiten. [**O. californica** Abrams]. Perennial from stout woody taproot; stems and pedicels densely covered with short appressed hairs. Occasional on rocky slopes, sometimes under brush, throughout. Subsp. **pilosa** (Nutt.) Eiten [**O. pilosa** Nutt.] is known from a single collection from the Universtly of California campus, West Los Angeles, where subsp. **californica** also grew formerly. 2-5.

2. ***O. corniculata** L. Occasional weed of lawns and waste places near gardens at low elevations throughout. 1-12. Native of Eurasia.

3. ***O. pes-caprae** L. Subglabrous perennial, leaves thinly pubescent beneath; peduncles mostly 1.5-2.5 dm tall, juicy. Common and colonial in open grassy or weedy places from Topanga Canyon east. 11-4. Native of southern Africa, widely introduced elsewhere.

4. ***O. rubra** St. Hil. Subglabrous perennial from a thick, swollen root; petals ca 1 cm long. Cultivated and rarely locally established near gardens, Los Angeles Basin. 3-6. Native of South America.

PAEONIACEAE Peony Family

1. **Paeonia** L. Peony

1. **P. californica** Nutt. ex T. & G. Glaucous, fleshy perennial herb with leafy hollow stems up to 7 dm tall arising in clumps from fascicled fleshy roots; leaves palmately compound and divided, dark green above, much paler beneath; petals 5-6, deep blackish-red, ca 1.5 cm long; follicles 3-4 cm long, ca 1.5 cm thick. Occasional in colonies on brushy slopes, generally under chaparral, throughout. 1-4.

PAPAVERACEAE Poppy Family

1a. Flowers regular; stamens mostly numerous	
2a. Shrubs, at least the base woody, more than 1 m tall	
3a. Petals white; leaves lobed; capsules ovoid	7. **Romneya**
3b. Petals yellow; leaves not lobed; capsules cylindrical	1. **Dendromecon**
2b. Herbs, less than 7 dm tall	
4a. Petals yellow, cream-colored to nearly white	
5a. Sepals fused into a calyptra which is pushed off by the expanding petals; leaves alternate, finely dissected	3. **Eschscholzia**
5b. Sepals distinct, usually not persistent; leaves opposite, entire	
6a. Leaves and pedicels glabrous; pedicels not scape-like	4. **Meconella**
6b. Leaves and pedicels long hairy; pedicels scape-like	6. **Platystemon**
4b. Petals red	
7a. Style lacking; stigma discoid, sessile	5. **Papaver**
7b. Style short; stigma capitate	8. **Stylomecon**
1b. Flowers irregular; stamens 6	2. **Dicentra**

1. **Dendromecon** Benth. Tree-Poppy

1. **D. rigida** Benth. subsp. **rigida**. Shrub with stiff, woody branches, usually 2-3 m tall; petals 2-3 cm long, yellow. In chaparral throughout the eastern two-thirds of the range. 2-4.

2. **Dicentra** Bernh. Bleeding Heart

1. **D. ochroleuca** Engelm. Glaucous, erect, perennial herb with several coarse stems from a stout rootstock, up to 15 dm tall; leaves scattered along the stem, 3-pinnate, pinnules dissected into narrow lobes; corolla off-white to cream, 20-25 mm long, the outer petals with only the tips spreading, the inner ones purple tipped. Occasional from Sepulveda Canyon westward in chaparral, often abundant after fire, or in disturbed places. 5-7.

3. **Eschscholzia** Cham. California-Poppy

1a. Petals deeps orange to light yellow, 2-6 cm long	2. E. **californica**
1b. Petals bright yellow, 1-2.5 cm long	1. E. **caespitosa**

1. **E. caespitosa** Benth. Annual 1-3 dm tall; petals bright yellow. Grassy or open areas in Sandstone Peak area and canyons leading to the ocean; above 1000 ft. 4-5.

2. **E. californica** Cham. Annual or perennial, up to 5 dm tall; petals deep orange to light yellow. In grassy areas or open slopes throughout the range below 2000 ft. 2-9.

4. **Meconella** Nutt.

1. **M. denticulata** Greene. [**M. oregana** Nutt. in T. & G. var. **denticulata** (Greene) Jeps.]. Inconspicuous annual, ca 10-15 cm tall; petals white, ca 3 mm long; capsules slender, 2 cm long and 2 mm wide. Moist slopes under chaparral, occasional; Monte Nido, Saddle Peak, Griffith Park. 3-4.

5. **Papaver** L. Poppy

1. **P. californicum** A. Gray. Annual usually 2-4 dm tall with milky juice; leaves pinnately divided; petals brick red with basal greenish spot; capsules turbinate 1-1.5 cm long. Southern oak woodland and chaparral, occasional or locally abundant after fire in the central portion of the range. 4-5.

6. **Platystemon** Benth. Cream Cups

1. **P. californicus** Benth. Annual 1-3 dm tall, petals 1-1.5 cm long, cream. Grassy areas, occasional away from the coast; Lake Sherwood, Griffith Park. 3-5.

7. **Romneya** Harv. Matilija Poppy

1. ***R. coulteri** Harv. Shrub 1-2 m tall, glabrous, spreading by underground stems and forming large clumps; petals 6-10 cm long, white. Saddle Peak near old cabin site, probably persisting after cultivation. 5-7. Native in southern California and adjacent Baja California, but introduced in our area.

8. **Stylomecon** G. Tayl.

1. **S. heterophylla** (Benth.) G. Tayl. Annual usually 2-4 dm tall with yellow juice; leaves pinnately divided; petals orange-red with basal purplish spot; capsule turbinate, 1-1.5 cm long. Oak woodland, burns, known only from vicinity of Malibu Lake. 4-5.

PLANTAGINACEAE Plantain Family

1. **Plantago** L.

1a. Inflorescence an elongate, slender spike, covering about a third of the scape	3. **P. major**
1b. Inflorescence a short, compact, terminal spike	
2a. Annuals with filiform or linear leaves	1. **P. erecta**
2b. Perennials with oblong-lanceolate leaves	2. **P. lanceolata**

1. **P. erecta** Morris. [**P. hookeriana** F. & M. var. **californica** (Greene) Poe]. California Plantain. Villose annual; leaves to 12 cm long; scapes erect to 25 cm tall; spikes short cylindric, to 2.5 cm long. Occasional on open ground in grassy areas throughout but more common in the western portion of the range. 2-5.

2. ***P. lanceolata** L. English Plantain, Ribwort. Perennial or biennial with short rootstock; leaves to 40 cm long, blades to 35 mm wide, with conspicuous tufts of long brown hairs at base of leaves; spikes to 6 cm long, short and ovoid at first but becoming elongated and cylindric in age; bracts long-acuminate, conspicuously surpassing calyx. Moist areas throughout, often in lawns. 4-10. Native of Europe and Asia.

3. ***P. major** L. Common Plantain. Glabrous or usually sparsely short pubescent perennial; leaf blades ovate, often subcordate, usually abruptly narrowed to form a winged petiole. In moist places throughout. 5-11. A variable species of world-wide distribution, native of Europe and Asia.

PLATANACEAE Sycamore Family

1. **Platanus** L. Sycamore, Plane Tree

1. **P. racemosa** Nutt. Large tree; bark smooth, white and light gray (or tan) blotched, exfoliating but sometimes thick and persistent on lower trunks of mature trees; leaves palmately lobed, deciduous, to 3 dm broad, tomentose when young; flowers in spherical, unisexual heads. Common along stream beds and moist areas throughout. 2-4.

PLUMBAGINACEAE Leadwort Family

1. **Limonium** Mill. Sea-Lavender, Marsh-Rosemary

1a. Flowers ca 5-6 mm long and 2 mm wide; calyx whitish — 1. **L. californicum**
1b. Flowers ca 9 mm long and 4-5 mm wide; calyx purplish-blue — 2. **L. perezii**

1. **L. californicum** (Boiss.) Heller. [**L. mexicanum** Blake]. Perennial herb with basal leaves; leaf blades to 20 cm long, mostly obtuse at apex, tapering into petioles about as long; inflorescence loosely paniculate, branches densely flowered at tips; calyx whitish; petals pale violet. Coastal salt marsh; Point Mugu. 7-12.

2. ***L. perezii** F. T. Hubb. Woody at base with basal leaves; leaf blades deltoid, to 15 cm long, truncate at base or at least abruptly narrowing to petioles which are longer than blades; calyx purplish-blue; petals pale yellow. Occasionally established on coastal bluffs; Pacific Palisades, Topanga. 3-9. Native of Canary Islands.

POLEMONIACEAE Phlox Family

1a. Leaves opposite
  2a. Leaves entire, rounded — 6. **Microsteris**
  2b. Leaves palmately cleft, needle-like — 5. **Linanthus**
1b. Leaves mainly alternate
  3a. Flowers in dense bracteate heads
    4a. Inflorescence covered with a dense white tomentum; annual or perennial — 2. **Eriastrum**
    4b. Inflorescence not covered with a dense white tomentum; annual — 7. **Navarretia**
  3b. Flowers not in dense bracteate heads
    5a. Shrub with prickly leaves — 4. **Leptodactylon**
    5b. Annual herb
      6a. Stamens equally inserted in corolla tube; anthers all at the same level; plants lacking a skunk-like odor; segments of upper leaves to 1 mm wide — 3. **Gilia**
      6b. Stamens unequally inserted in corolla tube; anthers at different levels; plants with a skunk-like odor; segments of upper cauline leaves 2-3.5 mm wide — 1. **Allophyllum**

1. **Allophyllum** (Nutt.) A. & V. Grant

1. **A. glutinosum** (Benth.) A. & V. Grant. Annual; leaves pinnately lobed, well distributed; plants entirely covered with erect glandular pubescence, viscid; corollas violet-blue, somewhat bilabiate. Occasional on disturbed slopes or burns at low elevations throughout. 4-6.

2. **Eriastrum** Woot. & Standl.

1a. Perennial with woody base; corolla 2-2.5 cm long — 1. **E. densifolium**
1b. Annual; corolla 0.8-1.5 cm long
  2a. Corolla 8-9 mm long, lobes 2-2.5 mm long — 2. **E. filifolium**
  2b. Corolla 14-15 mm long, lobes ca 6 mm long — 3. **E. sapphirinum**

1. **E. densifolium** (Benth.) Mason subsp. **elongatum** (Benth.) Mason. Perennial herb with woody base, 2-3 dm tall with many branches from base; corolla deep blue to blue-violet. Open sandy soil, rare; Aliso Canyon, Los Angeles River. 6-8.

2. **E. filifolium** (Nutt.) Woot. & Standl. Erect annual to 5 dm tall; corollas with blue lobes and yellow throat. Santa Monica Mountains, **Grant 502** (RSA).

3. **E. sapphirinum** (Eastw.) Mason subsp. **dasyanthum** (Brand) Mason. Annual, to 3 dm tall; corolla lobes blue, almost as long as yellow throat. Scattered throughout on rocky or disturbed slopes in chaparral away from the coast. 5-6.

3. **Gilia** Ruiz & Pav.

1a. Flowers up to 5 in a cluster; corollas blue-violet to white with a pale yellow throat — 1. **G. angelensis**
1b. Flowers 10-25, in dense subcapitate clusters; entire corolla lavender-blue — 2. **G. capitata**

1. **G. angelensis** V. Grant. Annual, mostly 1-2 dm tall. Frequent throughout in grassland or open spots in chaparral away from the immediate coast. 3-5.

2. **G. capitata** Sims subsp. **abrotanifolia** (Nutt. ex Greene) V. Grant. Annual, 2-8 dm tall. Occasional, roadside banks, burns, and disturbed open places in chaparral and southern oak woodland at low elevations throughout. 4-5.

G. australis (Mason & A. Grant) has been reported from burned slopes of Ladyface. Differs from above species in that the flowers are in 2's on unequal pedicels instead of dense heads or cymes of ca 5 flowers.

4. **Leptodactylon** Hook. & Arn.

1. **L. californicum** Hook. & Arn. subsp. **californicum**. Prickly-Phlox. Shrub up to 1 m tall, branches densely covered with fascicles of rigid needle-like leaves 3-12 mm long; corolla bright rose to rose-lavender. Common in openings in chaparral. 2-5.

5. **Linanthus** Benth.

1a. Flowers clustered in terminal heads; corollas with a filiform tube ca 2 cm long — 1. **L. androsaceus**
1b. Flowers not in heads; corollas without a filiform tube
  2a. Leaves opposite; flowers subsessile; corolla lobes fringed — 2. **L. dianthiflorus**
  2b. Leaves apparently whorled (actually opposite and deeply dissected); pedicels slender, 1-2.5 cm long; corolla lobes entire — 3. **L. liniflorus**

1. **L. androsaceus** (Benth.) Greene subsp. **micranthus** (Steud.) Mason. Annual; corollas white to pale lavender with yellow throat; anthers yellow; stigma long-exserted, yellow. Occasional in grassy openings in chaparral or southern oak woodland away from the immediate coast throughout. 4-5.

2. **L. dianthiflorus** (Benth.) Greene subsp. **dianthiflorus**. Ground-Pink. Annual, strict or densely branched, rarely more than 5 cm tall; corollas 1-2.5 cm long, lilac or pinkish with dark-spotted yellow throat. Occasional on grassy slopes or in open coastal sage scrub at low elevations along the southern flank of the mountains from Point Dume to Griffith Park. 2-4.

3. **L. liniflorus** (Benth.) Greene subsp. **pharnaceoides** (Benth.) Mason. Tall, slender, openly branched annual with sharp-pointed, rigid leaves; corollas ca 1 cm long, pale blue with yellow throat; anther orange. Occasional in rocky grassland along the crest and northern slope of the western half of the range. 5-6.

6. **Microsteris** Greene

1. **M. gracilis** (Dougl. ex Hook.) Greene subsp. **gracilis**. Erect annual, ca 1 dm tall, often unbranched, glandular-pubescent; corollas rose-pink, fading lavender. Rare in rocky grassland at low elevations along the northern edge of the mountains. 3-4.

7. **Navarretia** Ruiz & Pav.

1a. Seeds several in each locule; plants not glandular hairy; corollas purple or rarely white; bracts with few irregular divaricate teeth — 1. **N. hamata**
1b. Seeds 1-2 per capsule; plants glandular-hairy; corollas blue; bracts with numerous regular forward-directed teeth — 2. **N. pubescens**

1. **N. hamata** Greene. Erect annual, mosty under 1 dm tall; stamens exserted, unequal in length; plants with a skunk-like odor. Scattered throughout, back of the immediate coast, on shallow soil in chaparral. 5-6.

2. **N. pubescens** (Benth.) Hook. & Arn. Annual, ca 1-2 dm tall. Malibu Lake, Monte Nido, Conejo

Grade, Reagan Ranch, Malibu Creek State Park. 5.

POLYGALACEAE Milkwort Family

Polygala L.

1. **P. cornuta** Kell. var. **fishiae** (Parry) Jeps. Shrub ca 1 m tall; sepals pubescent; corollas pale purplish, ca 7-8 mm long. Rare, on shaded slopes, chaparral or dense southern oak woodland; Triunfo Canyon, Topanga Canyon, Cold Creek Canyon, Tapia Park, Crater Camp. 5-7.

POLYGONACEAE Buckwheat Family

1a. Leaves with evident hyaline stipular sheaths
  2a. Sepals usually 5, often petaloid, enlarging only slightly in fruit, lacking tubercles
    3a. Flowers in dense terminal spike-like racemes; leaves mostly more than 5 cm long; plants erect 5. **Persicaria**
    3b. At least some of flowers in axillary clusters; leaves mostly less than 3 cm long; plants often prostrate 6. **Polygonum**
  2b. Sepals 6, green, the inner ones usually enlarging considerably in fruit, the outer ones often and the inner ones sometimes bearing tubercles 8. **Rumex**
1b. Leaves lacking stipules
  3a. Flowers borne in a tubular or campanulate involucre; annual or perennial
    4a. Involucre with bristle-tipped teeth; annuals
      5a. Bracts 3-lobed, ca 1 cm long, ca 2 cm wide, clasping, subtending clusters of 1-3 involucres 4. **Mucronea**
      5b. Bracts entire 1. **Chorizanthe**
    4b. Involucre lacking bristle-tipped teeth; annuals or perennials 2. **Eriogonum**
  3b. Flowers subtended by bracts, not in an involucre; annuals
    6a. Leaves linear, in a basal rosette; calyx lobes with long spines 3. **Lastarriaea**
    6b. Leaves rounded, often notched at apex, opposite, cauline; calyx lobes lacking spines 7. **Pterostegia**

1. **Chorizanthe** R. Br. ex Benth.

1a. Bracts not leaflike, small and inconspicuous 1. **C. staticoides**
1b. Bracts leaflike 2. **C. wheeleri**

1. **C. staticoides** Benth. Turkish Rugging. Annual; bracts of main stems and branches not leaflike, except sometimes those of first node; calyx rose; stamens 9. Common on grassy slopes and in openings in brush throughout. 4-6.

2. **C. wheeleri** S. Wats. Gray-pubescent annual. Reported in Santa Monica Mountains (Munz 1974); dry chaparral.

2. **Eriogonum** Michx. Wild Buckwheat

1a. Plants perennial, often woody; involucres clustered or single at each node
  2a. Calyces bright yellow; plants entirely covered with a dense white tomentum; plants forming dense mats from which flowering stems arise 3. **E. crocatum**
  2b. Calyces white or pinkish; plants not otherwise as above
    3a. Involucres densely clustered in headlike inflorescences 1-2 cm across
      4a. Leaves linear, up to 3 mm wide 5. **E. fasciculatum**
      4b. Leaves ovate, mostly over 1 cm wide

5a. Calyx densely white-hairy without; leaves pubescent above at maturity 1. **E. cinereum**
5b. Calyx glabrous without; leaves glabrate above at maturity 7. **E. parvifolium**
3b. Involucres solitary at each node of inflorescence
6a. Leaves needle-like, ca 2 mm wide; involucres ca 2 mm long 8. **E. wrightii**
6b. Leaves oblong, ca 1 cm wide; involucres ca 4-5 mm long 4. **E. elongatum**
1b. Plants annual; involucres single at each node
7a. Stems and inflorescences tomentose to floccose; petioles slender 6. **E. gracile**
7b. Stems and inflorescences glabrous; petioles often winged 2. **E. citharaeforme**

1. **E. cinereum** Benth. Shrub; leaves obtuse, not revolute; inflorescences open; calyces whitish to pinkish. Common in coastal sage scrub at low elevations; Temescal Canyon westward, most abundant near the coast and along the west end of the range. 4-12. A hybrid between this species and **E. fasciculatum**, with broadly lanceolate leaves, has been collected in Topanga Canyon on an east-facing cliff at 1000 ft elevation.

2. **E. citharaeforme** S. Wats. Erect annual, similar to **E. gracile**; calyces white to rose. Dry slopes, disturbed fields, chaparral; between Calabasas and Agoura, Cold Creek drainage

3. **E. crocatum** A. Davids. Conejo Buckwheat. Perennial subshrub; leaf blades ovate, 1-2 cm long, 1-1.5 cm wide; involucres broadly campanulate, 5-7 mm across; calyces bright yellow. Rare and colonial in rock crevices; Conejo Mountain, Long Grade Canyon, Santa Rosa Valley, Lake Eleanor. 4-7.

4. **E. elongatum** Benth. Perennial herb with clumps of tall mostly bare erect flowering stems; leaves usually withered by flowering time; involucres widely spaced; inflorescence spiciform; calyces white to pinkish. Common in coastal sage scrub, southern oak woodland, and disturbed chaparral away from the immediate coast throughout. 8-11.

5. **E. fasciculatum** Benth. California Buckwheat. Woody shrub to ca 1 m tall; inflorescence open, cymose, with capitate clusters of involucres at tips; calyces white or pinkish. **E. fasciculatum** subsp. **fasciculatum**, with calyces and upper surfaces of leaves glabrous or nearly so, is found in coastal sage scrub and chaparral throughout; subsp. **foliosum** (Nutt.) Stokes, with calyces and upper surfaces of leaves evenly pubescent, is found at low elevations along north slopes and main ridge from Conejo Grade to Elysian Park. Intermediates are frequent. (1-) 4-10.

6. **E. gracile** Benth. Erect annual; leaves mostly basal, often withered by flowering time; calyces white, pinkish or yellow. Rare and colonial on open slopes or flats away from the coast from Mandeville Canyon westward. 8-10.

7. **E. parvifolium** Sm. Prostrate to spreading shrub; leaves revolute, densely white-tomentose below, dark green above, densely leafy; capitate clusters of inflorescences few; calyces white or tinged with pink. Common on coastal bluffs and in coastal sage scrub at low elevations along entire coast; not found far from the ocean. 4-10.

8. **E. wrightii** Torr. ex Benth. subsp. **membranaceum** (Stokes) Stokes. Subshrub; leaves revolute, crowded, bases encircling stems; inflorescence spiciform, ca 3-5 cm long; calyces white or pinkish. Forming large mats on bare weathered sandstone cliffs, Saddle Peak, 2450 ft; crest east of Castro Peak. 9-10.

3. **Lastarriaea** Remy

1. **L. coriacea** (Goodm.) Hoover. [**Chorizanthe coriacea** Goodm.]. Annual; calyx coriaceous, usually 5-cleft to middle; stamens 3. Rare, on sandy slopes near the coast, Santa Monica to Point Dume. 4-5.

4. **Mucronea** Benth.

1. **M. californica** Benth. [**Chorizanthe californica** (Benth.) A. Gray] Annual; stems well branched, densely covered with weak erect hairs; spines of involucres straight; calyx white. Sandy flats behind Point Dume.

5. **Persicaria** P. Miller

1a. Sheathing stipules fringed with cilia over 1 mm long
2a. Calyces prominently gland dotted 4. **P. punctata**
2b. Calyces not gland-dotted 2. **P. hydropiperoides**
1b. Sheathing stipules not ciliate; calyces not glandular-punctate
3a. Calyces bright rose; stems and leaves harshly strigose; perennial with creeping rhizomes 1. **P. amphibia**
3b. Calyces white or pale pink; stems and leaves glabrous or finely scabrous; coarse annual 2. **P. lapathifolia**

1. **P. amphibia** (L.) S. Gray var. **emersum** (Michx.) Hickman. [**Polygonum a.** L. var. **emersum** Michx., **P. coccineum** Muhl.]. Coarse perennial 1-2 m tall; stipules harshly strigose; spikes erect. Dense clumps in marshy ground, vicinity of Lake Sherwood. 8-10.

2. **P. hydropiperoides** Michx. [**Polygonum h.** Michx.] Coarse perennial to 1 m tall; racemes slender, interrupted. Sandy bed of Los Angeles River. 7-10. A variable species.

3. **P. lapathifolia** (L.) S. Gray. [**Polygonum lapathifolium** L.] Willow-Weed. Rank annual to 3 m tall; stipules subglabrous; spikes nodding. Occasional in marshy ground from the vicinity of Temescal Canyon westward, at low elevations on the northern side of the mountains. 8-10.

4. **P. punctata** (Ell.) Small. [**P. punctatum** Ell.] Water Smartweed. Perennial herb with erect stems; stipules glabrous. Locally common in marshy ground along north slope of western end of the mountains. 7-10.

6. **Polygonum** L.

1a. Achenes dull; all flowers borne in axils of leaves 1. **P. arenastrum**
1b. Achenes shining; upper leaves reduced and flowers clustered at summit of stem 2. **P. argyrocoleon**

1. ***P. arenastrum** Bor. [**P. aviculare** of authors, in part]. Knotweed. Usually sprawling or prostrate annual, often forming a dense mat; leaves elliptical. Common in waste and weedy ground at low elevations throughout. 2-10. Native of western Euasia.

2. ***P. argyrocoleon** Steud. ex Kunze. Erect annual; leaves linear; upper leaves greatly reduced, and inflorescence, therefore, racemose. Rare weed of waste ground around Santa Monica and West Los Angeles. 5-6. Native of western Asia.

7. **Pterostegia** Fisch. & Mey.

1. **P. drymarioides** Fitch. & Mey. Slender annual with decumbent filiform stems and inconspicuous small greenish axillary flowers; plants often reddish in age. Not common but scattered on grassy slopes at low elevation throughout. 3-5.

7. **Rumex** L.

1a. Leaves hastate, acid tasting; flowers unisexual 1. **R. acetosella**
1b. Leaves neither hastate nor acid-tasting; flowers usually perfect
2a. Annual, 1-5 dm tall; leaves to 3 cm long 6. **R. maritimus**
2b. Perennial, 3-15 dm tall; leaves to 30 cm long
3a. Fruiting valves 2-3 mm long
4a. Plants 8-15 dm tall; valves entire, each with a callosity 2. **R. conglomeratus**
4b. Plants 3-9 dm tall; valves subentire to denticulate, only 1 with a callosity 7. **R. salicifolius**
3b. Fruiting valves 4-8 mm long
5a. Valves entire; stems erect without axillary stems 4. **R. crispus**
5b. Valves subentire, denticulate, or minutely crenate-denticulate; stems strict, subflexuous, or prostrate
6a. Valves 6-8 mm long, callosity 2 mm long 5. **R. kerneri**
6b. Valves 4-5 mm long, callosity nearly covering valve 3. **R. crassus**

1. ***R. acetosella** L. Sheep Sorrel. Rhizomatous perennial with leaves to 4 cm long; inflorescence mostly leafless; mature fruit ca 1.5 cm long, valves not not adhering to achene. Rare weed of cultivated ground and gardens, area of Santa Monica and Los Angeles. 3-6. Native of Europe. **R. angiocarpus**, which is very similar but with valve adhering to the achene, may also be in our area.

2. ***R. conglomeratus** Murr. Erect biennial or perennial; branches of inflorescence arising at an angle of 30-90°. Scattered in wet places at low elevations throughout. 5-10. Native of western Eurasia and North Africa.

3. **R. crassus** Rech. f. Perennial with procumbent or flexuous-ascending stems; leaves fleshy, 2.5-3.5 times as long as wide; valve margins minutely and irregularly crenate-denticulate. Rare, damp streambed, coast NW of Santa Monica, **Roos 1743** (RSA); normally occurs along coast in sand and on bluffs; coastal strand, coastal sage scrub.

3. ***R. crispus** L. Curly Dock. Erect biennial or perennial; leaves 1-3 dm long with strongly crisped margins; branches of inflorescence usually arising at an angle of less than 30°. Common in waste places and along roads at low elevations throughout. 3-6. Native of Europe and Africa.

5. ***R. kerneri** Borb. Erect perennial branching above; leaves 1-2.2 dm long, 3-7 cm wide; panicle open, the lower glomerules remote, the upper ones contiguous; margins of valves subentire to denticulate. Common in wet areas; intermittent streambed; Calleguas Creek. 5-7. Native of Europe.

6. ***R. maritimus** L. var. **fueginus** (Phil.) Dusen. [**R. fueginus** Phil.]. Annual, turning golden-yellow when fruit is mature; leaves to 3 cm long; inflorescences leafy. Rare, wet places along rivers and creeks; 2 miles north of Point Mugu (perianth bristles wanting); Los Angeles River. 8-10. Native of Europe.

7. **R. salicifolius** Weinm. Many-branched perennial from a woody taproot; branches of inflorescence usually arising at an angle of ca 30°. Common in wet places as along seasonal streams, throughout at low elevations. 5-10.

PORTULACEAE Purslane Family

1a. Cauline leaves absent; sepals several, petaloid	4. **Lewisia**
1b. Cauline leaves present; sepals 2, not petaloid	
2a. Cauline leaves 2, connate into a conspicuous suborbicular disk	3. **Claytonia**
2b. Cauline leaves more than 2 and not as above	
3a. Capsules dehiscent by valves; styles 3 or fewer	
4a. Capsule valves 2; style 1	2. **Calyptridium**
4b. Capsule valves 3; styles 3	1. **Calandrinia**
3b. Capsules circumscissile; styles 5 or more	5. **Portulaca**

1. **Calandrinia** Kunth

1a. Plants green, seeds shining black	
2a. Mature capsules about twice as long as the calyx	1. **C. breweri**
2b. Mature capsules scarcely exceeding calyx	2. **C. ciliata**
1b. Plants glaucous, seeds dull gray	3. **C. maritima**

1. **C. breweri** S. Wats. Annual, stems spreading, to 4 dm long; cauline leaves reduced and nearly or quite sessile; flowers in elongated, open racemes; petals rose-red; pedicels generally reflexed in fruit. Burned or disturbed areas in chaparral, scattered throughout. 3-6.

2. **C. ciliata** (Ruiz & Pav.) DC. var. **menziesii** (Hook.) Macbr. Red-Maids. Annual, usually with several spreading stems; leaves well distributed; long petioled, narrowly oblanceolate to linear; flowers in leafy racemes; petals rose-red, rarely whtie; pedicels ascending to erect. Grassy slopes throughout. 2-6.

3. **C. maritima** Nutt. Fleshy annual, branched at base; stems to 2.5 dm long; leaves mostly basal, up to 6 cm long; petals red. Rare; Santa Monica, **Parry 713** (DS).

2. **Calyptridium** Nutt.

1. **C. monandrum** Nutt. Spreading annual with branches from base up to 15 cm long; leaves spatulate, mostly basal, some scattered along branches; branches of inflorescence scorpioid when young, elongate and secund with age; petals white, 3 or occasionally 2. Scattered and local on burns and in disturbed places at low elevations throughout. 3-6.

3. **Claytonia** L.

1. **C. perfoliata** Donn. Miner's Lettuce. Low, glabrous, succulent annual to 3 dm high; petals white. Common in shaded and vernally moist places, chaparral and southern oak woodland. 2-5.

4. **Lewisia** Pursh

1. **L. rediviva** Pursh var. **rediviva**. Bitterroot. Perennial herb with short caudex and many stems, 1-3 dm long; leaves basal, linear, fleshy; bracts 5-8, whorled; sepals several, entire, petaloid; petals rose or white, 2-2.5 mm long. Rocky outcrops or ridges E and W of Westlake Blvd.

5. **Portulaca** L.

1. ***P. oleracea** L. Purslane. Prostrate succulent annual, stems to 3 dm long; flowers sessile, mostly opening only in sunshine; petals yellow, sepals keeled; style deeply 5-6 parted. Common throughout in disturbed places. Cosmopolitan weed of temperate and warm temperate regions of the world. 6-10.

PRIMULACEAE Primrose Family

1a. Plants with a naked scape bearing an umbel of several flowers; flowers nodding at anthesis; petals reflexed 2. **Dodecatheon**
1b. Plants not as above
  2a. Leaves opposite; flowers salmon, rarely white, solitary on long pedicels in leaf axils 1. **Anagallis**
  2b. Leaves alternate; flowers white, in racemes 3. **Samolus**

1. **Anagallis** L. Pimpernel

1. ***A. arvensis** L. Low, spreading annual; corolla rotate, salmon, rarly white; pedicels recurved in fruit; capsules operculate. Occasional throughout in disturbed places. 2-10. Native of Eurasia.

2. **Dodecatheon** L. Shooting Star

1. **D. clevelandii** Greene. Perennial, leaves in basal rosette; scape 2-4 dm tall; flowers erect in bud, nodding at anthesis, and erect in fruit; corolla tube dark maroon with yellow band above, lobes magenta varying to white; capsule operculate. In grassy areas throughout but absent on the inland portion of the range north of the higher peaks. Plants in the western portion of the range have a dark connective and a yellow spot on the filament tube and are subsp. **sanctarum** (Greene) Abrams, which ranges north along the immediate coast to San Francisco. Plants from the eastern end of the range have a yellow connective and are subsp. **clevelandii**, which ranges south to Baja California. Populations in the central, coastal portion of our area are highly variable in connective color and are intermediate between the two subspecies. 2-4.

3. **Samolus** L.

1. **S. valerandi** L. subsp. **parviflorus** (Raf.) Hulten. [**S. parviflorus** Raf.]. Perennial herb; stems solitary, erect, 2-4 dm tall; corolla white. Wet places; Topanga Canyon, **Barber** (Jepson 1936, v 3, p 76).

RANUNCULACEAE Buttercup Family

1a. Woody vine with opposite leaves; achenes with long persistent feathery tails formed from the styles — 1. **Clematis**
1b. Herbs; leaves basal or spirally arranged; fruits lacking plumose tails
  2a. Plants dioecious; flowers greenish; petals absent — 4. **Thalictrum**
  2b. Plants not dioecious; flowers hermaphroditic; flowers blue, red, or yellow; petals usually present
    3a. Flowers strongly zygomorphic, spurred, blue or red; fruit a follicle — 2. **Delphinium**
    3b. Flowers actinomorphic, yellow; fruit an achene — 3. **Ranunculus**

1. **Clematis** L. Clematis, Virgin's-Bower

1a. Flowers 1-3, on long axillary peduncles — 1. **C. lasiantha**
1b. Flowers many, in cymose panicles — 2. **C. ligusticifolia**

1. **C. lasiantha** Nutt. Half woody vine; leaflets 3-5; flowers like those of **C. ligusticifolia** sepals 1-2.5 cm long. Climbing over shrubs in chaparral away from the immediate coast; throughout. 2-5.

2. **C. ligusticifolia** Nutt. Half woody vine; leaves mostly with 5-7 leaflets; sepals about 1 cm long, white, petaloid, hairy on both sides; petals absent. Climbing over trees in canyons, often near streams, from vicinity of Saddle Peak and Topanga Canyon eastward. 4-6.

2. **Delphinium** L. Larkspur

1a. Flowers scarlet, petals mostly yellow; plants mostly 1-2 m tall — 1. **D. cardinale**
1b. Flowers blue to white; plants mostly under 1 m tall
  2a. Divisions of leaves present at flowering time usually less than 5 mm wide; follicles and stems puberulent; root a cluster of woody branches — 2. **D. parryi**
  2b. Divisions of leaves present at flowering time often 1-2 cm wide, rounded; follicles glabrous; stems subglabrous; root tuberous — 3. **D. patens**

1. **D. cardinale** Hook. Scarlet Larkspur. Herbaceous perennial; leaf-divisions narrow; sepals scarlet; petals yellow with scarlet tips; follicles glabrous. Common throughout on brush slopes and roadbanks away from the immediate coast. 6-7.

2. **D. parryi** A. Gray. Perennial herb, mostly 3-6 dm tall, stout, erect. Plants with sepals blue, 10-15 mm long; petals blue are subsp. **parryi**, which forms frequent colonies, usually in more or less exposed grassland, away from the coast; throughout. 6-7. Plants with sepals blue-purple, 15-18 mm long; petals white or light colored are subsp. **blochmaniae** (Greene) Lewis & Epling, which occurs in Long Grade Canyon, just behind Camarillo State Hospital. This distinctive subspecies was formerly known only from the area between Nipomo Mesa, San Luis Obispo Co. and Lompoc, Santa Barbara Co. 4-5.

3. **D. patens** Benth. subsp. **hepaticoideum** Ewan. Herbaceous perennial, mostly 2-5 dm tall, often somewhat lax, slender, and decumbent; sepals dark blue; petals whitish with blue lines. Frequent on shaded, usually rocky banks in southern oak woodland throughout, away from the coast. 3-5.

3. **Ranunculus** L. Buttercup

1a. Perennial; flowers 5-30 cm across; petals 5-16, conspicuous; achenes usually more than 10 per flower
  2a. Beak of achene recurved; at least petioles conspicuously long-hairy; leaves deeply divided — 1. **R. californicus**
  2b. Beak of achene straight; plants subglabrous; leaves cordate, shallowly crenate — 2. **R. cymbalaria**
1b. Slender annual mostly 1-2 dm tall; flowers ca 2 mm across; petals 0-5, inconspicuous; achenes 4-10 per flower — 3. **R. hebecarpus**

1. **R. californicus** Benth. var. **californicus**. California Buttercup. Perennial herb, leaves mostly basal; petals mostly 9-16, yellow. Occasional in colonies on grassy slopes and openings below

2000 ft elevation, throughout. 2-4.

2. **R. cymbalaria** Pursh subsp. **saximontanus** (Fern.) Thorne. Stoloniferous perennial; petals 5-12, 4-8 mm long, yellow. Rare; wet sandy places along bed of the Los Angeles River. 6-8.

3. **R. hebecarpus** H. & A. Erect annual; stems filiform, pubescent; leaves ca 1 cm across, deeply cut; petals about 1 mm long, yellow. Grassy slopes in southern oak woodland or under chaparral along the crest and north side of the western half of the range. 4.

4. **Thalictrum** L. Meadow Rue

1. **T. polycarpum** S. Wats. Coarse perennial 1-2 m tall; leaves spirally arranged, decompound, mostly basal; stems stout, hollow; fruits green, ribbed achenes ca 5 mm long; style persistent as a short hook. Scattered in colonies on brushy slopes from Mandeville Canyon westward. 4-5.

RESEDACEAE Mignonette Family

1. **Oligomeris** Camb.

1. ***O. linifolia** (Vahl) Macbr. [**O. subulata** (Del.) Boiss.]. Erect glabrous annual with linear, entire, often fascicled leaves; flowers small, greenish, in dense terminal bracteate spikes 2-10 cm long; petals oblong, whitish; stamens 3; capsules 4-toothed. Formerly known from the bluffs at Santa Monica, but apparently not collected since 1902. 2-7. Probably introduced from the Mediterranean region.

RHAMNACEAE

1a. Flowers white, lavender or blue; petals conspicuous, much longer than sepals, cup-shaped and attached by a slender claw; fruit a 3-celled capsule — 1. **Ceanothus**

1b. Flowers greenish; petals equaling or shorter than sepals, or absent; fruit a berrylike drupe — 2. **Rhamnus**

1. **Ceanothus** L. California-Lilac

1a. Stipules thin and falling soon after leaves develop; lower surface of leaves smooth and lacking stomatal pits; fruits without horns on the 3 rounded apical segments (subgenus **Ceanothus**)

2a. Leaves serrate, with 3 prominent veins from base; terminal branchlets flexible, not spinose; flowers blue — 5. **C. oliganthus**

2b. Leaves entire or with a few scattered teeth, leaf veins 1 or 3 from base; terminal branchlets divaricate, rigid, some of them dying and thus spinose; flowers white to blue

3a. Leaves glossy on lower surface, with 1 prominent vein from base — 6. **C. spinosus**

3b. Leaves glaucous on lower surface, with 3 prominent veins from base, the lateral 2 may be obscure — 3. **C. leucodermis**

1b. Stipules thick, short and persistent; lower surface of leaves rough with stomatal pits; fruits with an apical horn on each of the segments (subgenus **Cerastes**)

4a. Leaves alternate — 4. **C. megacarpus**

4b. Leaves opposite

5a. Leaves 4-6 mm wide, entire, midrib glabrous to subglabrous on lower surface — 2. **C. cuneatus**

5b. Leaves 8-15 mm wide, at least some leaves with few to several teeth on margin; midrib densely white tomentose on lower surface — 1. **C. crassifolius**

1. **C. crassifolius** Torr. Shrub usually 1-3 m tall; flowers white. In chaparral from Topanga Canyon to Conejo Grade on the inland side of the mountains and on Castro Peak, Saddle Rock, and Boney Ridge. 3-4.

2. **C. cuneatus** (Hook.) Nutt. Buck Brush. Shrub usually 1-3 m tall; flowers white. In chaparral on dry, sunny slopes below 2000 ft on the inland side of the mountains from Triunfo Canyon area to Old Topanga Canyon. 2-4.

3. **C. leucodermis** Greene. Large shrub with smooth, green bark; leaves ovate, rarely elliptic, apex acute to obtuse; petals white to blue. Rare; a small stand of perhaps 30 shrubs on the northwest slope of Sandstone Peak at 2400 ft; more abundant at Cold Creek. 4-5. Growing with **C. oliganthus** and occasionally interspecific hybrids.

4. **C. megacarpus** Nutt. Big-Pod Ceanothus. Shrub usually 3-5 m tall; flowers white. Common throughout area and a major element of the chaparral on south slopes where it often comprises 50% of the shrub cover. 1-3.

5. **C. oliganthus** Nutt. Large shrub, often arborescent; leaves pubescent on upper surface; petals deep blue or purplish. Occasional in chaparral on moist, north slopes; on higher peaks; Boney Ridge, Saddle Peak, and in upper Malibu Creek area. 3-4. Hybridizes with **C. spinosus**.

6. **C. spinosus** Nutt. Red-Heart, Greenbark Ceanothus. Large shrub often arborescent, bark green; leaves elliptic, oblong, obtuse or emarginate at apex; petals pale blue to white. Common throughout area and a major element of the chaparral on moister slopes and canyon bottoms. 2-5. Hybrids between **C. spinosus** and **C. oliganthus** occur rarely wherever the two species grow together; Saddle Peak; Triunfo Lookout.

2. **Rhamnus** L. Buckthorn, Cascara

1a. Flowers 5-merous; petals present; leaves lanceolate, usually 5-9 cm long, at least 2 times longer than wide — 1. **R. californica**
1b. Flowers 4-merous; petals absent; leaves elliptic, usually 1-5 cm long, only slightly longer than wide
  2a. Leaves usually less than 1.5 cm long; spinescent, compact shrub with both short and long shoots; flower buds only as long as wide — 2. **R. crocea**
  2b. Leaves 2-5 cm long; open shrub lacking short shoots; flower buds twice as long as wide — 3. **R. ilicifolia**

1. **R. californica** Esch. California Coffeberry. Open shrub or small tree usually 2-4 m tall; berries ca 1 cm in diameter, black or red when ripe. Southern oak woodland and chaparral throughout. 5-6. Plants with lower leaf surface glabrous are subsp. **californica.** The plants from the area just east of Lake Sherwood and near Saddle Rock have the lower surface of the leaves densely pubescent with short, white hairs and are subsp. **tomentella** (Benth.) C. B. Wolf.

2. **R. crocea** Nutt. ex T. & G. Buckthorn. Much branched, spinescent shrub 1-2 m tall. In open chaparral and coastal sage scrub. Occasional along the coast and at Brent's Mountain Crags. 3-4.

3. **R. ilicifolia** Kell. [**R. crocea** Nutt. ex T. & G. subsp. **ilicifolia** (Kell.) C. B. Wolf]. Open shrub usually 2-3 m tall. In chaparral throughout but not on the immediate coast. 1-5.

ROSACEAE

1a. Shrubs, small trees, or woody vines
  2a. Leaves compound; plants with prickles or thorns on stem
    3a. Shrubs; fruit derived from the calyx-tube and receptacle, with at least one dry achene in a central depression and sepals persistent
      4a. Pistil 1 — 4. **Chamaebatia**
      4b. Pistils few to many — 11. **Rosa**
    3b. Vines or somewhat twining; fruit an aggregation of drupelets on a conical receptacle held above the deciduous calyx — 12. **Rubus**
  2b. Leaves simple; plants lacking prickles and thorns
    5a. Leaves needle-like — 1. **Adenostoma**
    5b. Leaves broad, not needle-like
      6a. Ovary inferior, fruit a pome — 5. **Heteromeles**
      6b. Ovary superior
        7a. Leaves prickly, holly-like; fruits a drupe, 1-1.5 cm long — 9. **Prunus**

7b. Leaves soft; fruits dry
8a. Petals present; flowers in ample, terminal panicles; seeds not tailed 6. **Holodiscus**
8b. Petals absent; flowers mostly in axillary clusters of 2-3; seeds with long feathery tail 4-10 cm long, derived from the style 3. **Cercocarpus**
1b. Annual or perennial herbs
9a. Petals absent
10a. Delicate annual with palmately lobed leaves 2. **Alchemilla**
10b. Coarse perennial with pinnately compound leaves 9. **Sanguisorba**
9b. Petals present; perennial with pinnately compound leaves
11a. Filaments conspicuously dilated 7. **Horkelia**
11b. Filaments not dilated 8. **Potentilla**

1. **Adenostoma** H. & A.

1a. Leaves in fascicles; flowers sessile 1. **A. fasciculatum**
1b. Leaves not in fascicles; flowers pedicellate 2. **A. sparsifolium**

1. **A. fasciculatum** H. & A. Chamise, Greasewood. Shrub 1-2 m tall; bark reddish brown; bracts lance-linear, or scarious; petals white. One of the dominants found throughout in chaparral and upper coastal sage scrub away from the immediate coast.

2. **A. sparsifolium** Torr. Red Shank. Shrub 2-6 m tall; bark red brown and peeling off in long strips; bracts broadly lanceolate, scarious margined; petals white. Colonial in chaparral on the main ridge of the mountains from vicinity of Saddle Peak westward to the area of Boney Ridge, mostly above 1700 ft; but with scattered individuals down to 1000 ft.

2. **Alchemilla** L.

1. **A. arvensis** (L.) Scop. [**A. occidentalis** Nutt.]. Slender annual, branched from base, mostly under 5 cm tall, with flowers borne up and down the wiry stems; calyx-tube ca 1 mm long; stamen 1. Grassy openings in southern oak woodland, upper Malibu Canyon and doubtless elsewhere; very inconspicuous. 4-5.

3. **Cercocarpus** Kunth

1. **C. betuloides** Nutt. ex T. & G. var. **betuloides.** [**C. montanus** Raf. var. **glaber** (Wats.) F. L. Martin]. Shrub or small tree 2-5 m tall; calyx-tube with a persistent brown parchment-like lower portion. Common in chaparral back of the immediate coast throughout. 3-5. Plants with leaves more than 3 cm long and with 6-10 lateral veins on each side of midrib, and thus like the Channel Island var. **blanchaea** (Schneid.) Little [**C. m.** var. **blanchaea** (Schneid.) F. L. Martin], occur above 1800 ft in the Saddle Rock area.

4. **Chamaebatia** Benth.

1. **C. australis** (Bdg.) Abrams. Shrub 6-20 dm high; twigs somewhat glandular pubescent; leaves bi- or tripinnate; petals white. Rare on north-facing slopes on volcanic substrate; Rocky Oaks, **Thomas 441** (LA). 4.

5. **Heteromeles** M. Roem.

1. **H. arbutifolia** (Ait.) M. Roem. [**Photinia a.** Lindl.]. Toyon, California Christmas Berry. Tree or large shrub, 2-6 m tall; leaves oblong, 5-10 cm long, serrate, leathery; petals white; fruits 2-6 mm long, red, ripening in late fall and winter. Chaparral and coastal sage scrub throughout. 6-7.

6. **Holodiscus** Maxim.

1. **H. discolor** (Pursh) Maxim. var. **franciscanus** (Rydb.) Jeps. Ocean Spray. Shrub 0.5-1.5 m tall; petals white, 2 mm long. Rare in shady protected sites, often along streams; Conejo Mountain, Malibu Canyon, Pacific Palisades. 5-7.

7. **Horkelia** Cham. & Schlecht.

1. **H. cuneata** Lindl. subsp. **cuneata**. [**Potentilla lindleyi** Greene]. Perennial herb; leaves tufted at base, reduced on flower stems; stems 1-5 cm tall; upper pair of leaflets sessile. Sandy flats or open brush covered slopes; Point Dume to Sepulveda Canyon. 4-10.

8. **Potentilla**

1a. Petals bright yellow; stems prostrate, rooting at nodes 1. **P. egedei**
1b. Petals creamy or white; stems erect, not rooting at nodes 2. **P. glandulosa**

1. **P. egedei** Wormsk. var. **grandis** (Rydb.) J. T. Howell. Low, stoloniferous perennial; leaves green above, white tomentose beneath; leaflets 6-31; petals 10-12 mm long, yellow. Reported from borders of coastal salt marshes at Oxnard and Santa Monica. 4-9.

2. **P. glandulosa** Lindl. subsp. **glandulosa**. Perennial from woody caudex; leaves tufted at base, reduced on flower stems; stems 4-8 cm tall; uppermost pair of leaflets with short distinct stalks; petals creamy or white. Scattered below 2000 ft throughout, on shaded hillsides and in canyons. 4-6.

9. **Prunus** L.

1. **P. ilicifolia** (Nutt.) Walp. subsp. **ilicifolia**. Islay, Holly-Leaved Cherry. Shrub and small tree 1-5 m tall; leaves 2-5 cm long; flowers in racemes; petals white; fruits green becoming red when ripe. Common in chaparral away from immediate coast throughout. 3-5.

10. **Rosa** L.

1. **R. californica** C. & S. California Rose. Shrub 1-3 m tall with stout prickles scattered on the stems; leaves pinnately compound, leaflets 5-7; petals bright purplish-pink; ripe fruits red. Scattered throughout below 2000 ft, mostly in coastal sage scrub and southern oak woodland, usually along streams. 4-7.

11. **Rubus** L.

1a. Leaflets 5, on vigorous shoots, palmate; flowers borne in large terminal panicles 1. **R. procerus**
1b. Leaflets 3, on vigorous shoots, very rarely 5 and then pinnate; flowers 2-15 in small cymose or racemose clusters 2. **R. ursinus**

1. ***R. procerus** P. J. Muell. Himalaya Berry. Sprawling shrubs; prickles broad-based. Rare in open weedy places; Lake Sherwood, Elysian Park. 5-8. Native of Europe.

2. **R. ursinus** Cham. & Schlecht. California Blackberry. Vine, scrambling over shrubs; prickles slender, numerous. Open or more or less protected places throughout, below 2000 ft. 2-5.

12. **Sanguisorba** L.

1. ***S. minor** Scop. Perennial herb 3-5 cm tall, leaves scattered up and down stems; leaflets prominently stalked and sharply toothed; flowers in dense terminal capitate clusters; sepals purple tinged. Rare weed of disturbed soil; Mandeville Canyon, Trippett Ranch, Malibu Canyon. 6-8. Native of western Eurasia and North Africa.

RUBIACEAE Madder Family

1a. Flowers solitary or cymose; corollas rotate, white or greenish	1. **Galium**
1b. Flowers in involucrate heads; corollas funnelform	2. **Sherardia**

1. **Galium** L. Bedstraw

1a. Fruits glabrous	
2a. Leaves linear, glabrous, pungent; plants forming low, dense mats	1. **G. andrewsii**
2b. Leaves narrowly lanceolate	
3a. Stems retrorsely hispid	5. **G. nuttallii**
3b. Stems not retrorsely hispid	4. **G. cliftonsmithii**
1b. Fruits bristly	
4a. Scrambling woody perennial; leaves linear, 4 at a node	2. **G. angustifolium**
4b. Annual; leaves 6-8 at a node	3. **G. aparine**

1. **G. andrewsii** A. Gray. Perennial, woody at base; leaves 4 at a node; corolla greenish white; berries black, 2-3 mm in diameter. Local colonies on rocky slopes in southern oak woodland, north slope and higher elevations of west end of the range. 5-6.

2. **G. angustifolium** Nutt. subsp. **angustifolium**. Perennial, woody at base, up to 1 m or more in height; branches subglabrous on angles; flowers clustered in terminal cymes; corolla cream-colored to greenish-yellow. Common throughout in coastal sage scrub or open chaparral. Subsp. **foliosum** (Hilend. & Howell) Demp. & Steb., with very crowded leaves 3-6 mm long, has been collected near the head of Coldwater Canyon. 4-6.

3. ***G. aparine** L. Weak sprawling and climbing densely retrorsely-hispid annual; corolla whitish; fruits 1.5-4 mm in diameter. Occasional on more or less shaded slopes at low elevations throughout. 3-5. Native of Eurasia.

4. **G. cliftonsmithii** (Demp.) Demp. & Steb. [**G. nuttallii** var. **cliftonsmithii**]. Stoutish perennial from woody base; leaves shiny; stems sharply angular, coarsely scabrous; corolla greenish or pale yellow. Reported from light shade under **Quercus agrifolia** (Munz 1974).

5. **G. nuttallii** A. Gray. Scrambling, dioecious perennial from woody base; stems retrorsely hispid; leaves 4 at each node; corolla yellowish-green; berries black, 2-3 mm in diameter. Frequent throughout on more or less protected brush slopes. 2-6.

2. **Sherardia** L. Field Madder

1. ***S. arvensis** L. Tufted annual with leaves 5-10 mm long in whorls of 4-6; fruit covered with short appressed bristles. Occasional lawn weed in the Los Angeles Basin. Native of the Mediterranean region. 1-7.

RUTACEAE Rue Family

Ruta L. Rue

1. ***R. chalapensis** L. Aromatic perennial herb with ± woody base; leaves bipinnate; petals yellow, lacerate along margin. Rare; known only from an area around an old ranch site where it is spreading into coastal sage scrub. Native of Mediterranean region.

SALICACEAE Willow Family

1a. Leaves ovate to deltoid, rarely twice as long as wide	1. **Populus**
1b. Leaves lanceolate or oblanceolate, usually at least four times as long as wide	2. **Salix**

1. **Populus** L. Cottonwood

1a. Leaves green on both surfaces, slightly paler below; petioles strongly flattened laterally — 1. **P. fremontii**
1b. Leaves distinctly glaucescent and whitish beneath, the two surfaces contrasting strongly — 2. **P. trichocarpa**

1. **P. fremontii** S. Wats. Fremont Cottonwood. Tall tree with pale gray bark. Scattered along streams and in marshy places; riparian woodland; throughout. 3.

2. **P. trichocarpa** T. & G. [**P. angustifolia** James subsp. **trichocarpus** (T. & G.) Brayshaw]. Black Cottonwood. Tall tree with gray bark. Mostly shady places along permanent streams at low elevations; riparian woodland; Malibu, Topanga and Sequit canyons. 2-3.

2. **Salix** L. Willow

1a. Leaves finely pubescent on both sides, often appearing silvery, 0.3-1 cm wide, linear to narrowly lanceolate — 1. **S. hindsiana**
1b. Leaves glabrous or sometimes very finely pubescent when young, green above, glaucous below, lanceolate to oblanceolate, wider than 1 cm
  2a. Flower bracts yellowish, usually deciduous in fruit; stamens 4-5
    3a. Bud scale with free overlapping margins; petiole not glandular — 2. **S. laevigata**
    3b. Bud scale without free overlapping margins; petiole glandular above — 3. **S. lasiandra**
  2b. Flower bracts dark pigmented, densely hairy, persistent; stamens 2 — 4. **S. lasiolepis**

1. **S. hindsiana** Benth. var. **leucodendroides** (Rowlee) Ball. [**S. sessilifolia** Nutt.]. Sandbar Willow. Shrub 2-5 m tall; leaves remotely denticulate; catkins appearing with mature leaves; stamens 2, free, filaments pubescent. Sandy places in river beds at low elevations along the entire north side of the range, and south along the west end to Point Mugu, where it grows along the borders of coastal salt marsh. 10-4.

2. **S. laevigata** Bebb. Black Willow. Tree 3-15 m tall, with a distinct trunk, bark black, checkered; leaves green above, glaucous below; flower bract yellowish; filaments pilose. Common in wet places throughout; riparian woodland. 3.

3. **S. lasiandra** Benth. var. **lasiandra**. Tree 6-15 m tall; leaves lanceolate, acuminate at apex, glandular serrate on margins, dark green above, glaucous below; petiole glandular above; flower bracts yellowish. Not very common or poorly collected; riparian woodland; Los Angeles River. 1-3.

4. **S. lasiolepis** Benth. Arroyo Willow. Small bushy tree, to 10 m tall, usually with many branches from base; bark gray, furrowed; leaves dark green above, glaucous below; flower bracts dark pigmented, densely hairly; stamens 2; filaments glabrous, united below. Abundant in wet places throughout; riparian woodland. 1-3 (mostly 1-2).

SAURURACEAE

1. **Anemopsis** Hook. Yerba Mansa

1. **A. californica** Hook. Glaucous perennial herb; leaves basal, up to 5 dm long; inflorescence a conical spike with ca 6 or 7 conspicuous, white involucral bracts 1.5-3.5 cm long at base of inflorescence, thus appearing like a large single flower. In very wet soil or shallow water; lagoon at Point Mugu, Malibu Lagoon, spring near Calabasas. 4-7.

SAXIFRAGACEAE Saxifrage Family

1a. Shrubs; petals white, yellow, pink or red — 3. **Ribes**
1b. Herbs; petals white
  2a. Petioles and stems covered with long, spreading hairs; fertile stamens 5 — 1. **Boykinia**
  2b. Petioles and stems subglabrous; fertile stamens 10
    3a. Leaves all basal, ovate, margins denticulate; styles 2 — 4. **Saxifraga**
    3b. Leaves both basal and cauline, rounded, 3-5 lobed; style 3 — 2. **Lithophragma**

1. **Boykinia** Nutt.

1a. Petals 3-4 mm long, conspicuous; leaves with evident, acute lobes	1. **B. elata**
1b. Petals ca 2 mm long, barely exceeding calyx; leaves round-cordate, not deeply lobed	2. **B. rotundifolia**

1. **B. elata** (Nutt.) Greene. Perennial herb, 2-6 dm tall, less hairy than preceding; stipules brownish, bristlelike; petals white. Along streams; Topanga Canyon, **Barber** (Jepson 1936, v 2, p 126). Santa Ynez Canyon.

2. **B. rotundifolia** Parry. Perennial herb, 3-8 dm tall, densely covered with erect glandular pubescence; leaves cauline and basal; stipules not evident; petals white. Moist soil near streams, lower Malibu Canyon. 5-6.

2. **Lithophragma** Nutt.

1. **L. affine** A. Gray subsp. **mixtum** R. L. Taylor. Woodland Star. Perennial herb, mostly 3-5 dm tall; flowers scattered; hypanthium ca 5 mm long, rounded, with an obconic base, densely covered with glandular hairs; petals 6-10 mm long, entire or 3-lobed, white. Common throughout on shaded slopes that are moist in spring. 2-6.

3. **Ribes** L. Currant, Gooseberry

1a. Flowers bright red, 4-parted	4. **R. speciosum**
1b. Flowers not bright red, 5-parted	
2a. Branches spiny	2. **R. californicum**
2b. Branches not spiny	
3a. Flowers yellow; leaves subglabrous	1. **R. aureum**
3b. Flowers pinkish or white; leaves hairy	3. **R. malvaceum**

1. **R. aureum** Pursh var. **gracillimum** (Cov. & Britt.) Jeps. Golden Current. Attractive deciduous shrub 1-2 m tall; leaves mostly 3-lobed, gray-green; floral tube slender, yellow; berry yellow or orange, smooth. Local in southern oak woodland along north slope of mountains from Triunfo Canyon to Griffith Park. 1-4.

2. **R. californicum** H. & A. var. **hesperium** (McClat.) Jeps. [**Grossularia californicum** (H. & A.) Cov. & Britt. var. **hesperia** Jeps.]. Spreading deciduous shrub mostly less than 1 m tall; leaves lobed, 1-3 cm across; flowers hanging below branches; sepals reddish; berry bristly. Occasional on shaded slopes in chaparral and southern oak woodland away from the coast, Malibu Creek eastward. 1-3.

3. **R. malvaceum** Sm. subsp. **viridifolium** Abrams. Chaparral Currant. Erect glandular deciduous shrub 1-2 m tall; flowers mostly dark pink; berries red to purple-black. In chaparral up to 2700 ft elevation throughout. 10-3. **Ribes malvaceum** var. **indecorum** (Eastw.) Jancz, with smaller leaves and white flowers occurs on and near the summit ridge, above 1500 ft elevation, from Saddle Peak to Boney Ridge. It intergrades with subsp. **viridifolium** where the two come into contact.

4. **R. speciosum** Pursh. Fuschsia-Flowered Gooseberry. [**Grossularia speciosum** (Pursh) Cov. & Britt.]. Evergreen, densely branched, spiny shrub 1-2 m tall; flowers red; berry glandular-bristly. Common throughout in chaparral, but not on the immediate coast. 2-4.

4. **Saxifraga** L. Saxifrage

1. **S. californica** Greene. Annual, mostly 1-2 dm tall; stems covered with glandular hairs; leaves mostly 2-5 cm long; petals white. Scattered throughout on rocky, shaded slopes in shallow soil; not on the immediate coast. 2-4.

SCROPHULARIACEAE Figwort Family

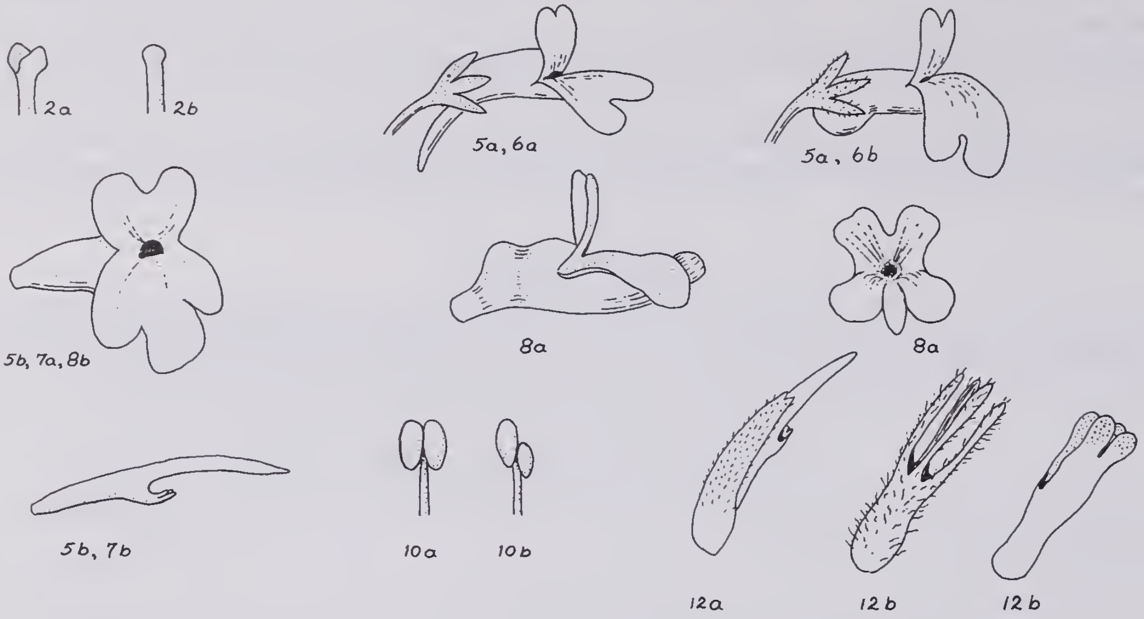

Figure 23. Characteristics of Scrophulariaceae referred to in key.

1a. Plants lacking chlorophyll, root parasites **9. Orobanche**
1b. Plants with chlorophyll
2a. Stigma of 2 flat, horizontal lobes
3a. Woody shrubs, 5-15 dm tall **5. Diplacus**
3b. Annuals or herbaceous perennials **8. Mimulus**
2b. Stigma entire, capitate
4a. Corolla subrotate; stamens 2 **13. Veronica**
4b. Corolla bilabiate; stamens 4, a fifth filament without anther sometimes present
5a. Corolla spurred or saccate ventrally at base
6a. Corolla with long narrow spur at base **7. Linaria**
6b. Corolla saccate at base **1. Antirrhinum**
5b. Corolla not spurred or saccate ventrally at base, but sometimes gibbous dorsally
7a. Upper lobes of corolla spreading, not forming a galea
8a. Annuals; corolla gibbous dorsally at base, middle lobe of lower lip concealed by the lateral lobes and forming a keel in which the stamens are included **3. Collinsia**
8b. Perennials; corolla not gibbous, the lower lip not forming a keel
9a. Corolla less than 1.5 cm long, reddish brown to maroon **13. Scrophularia**
9b. Corolla more than 2.5 cm long, red, blue or red-purple
10a. Scandent shrub 2-3 m tall; filaments pubescent at base **6. Keckiella**
10b. Suffrutescent shrub 0.8-1.2 m tall; filaments glabrous **12. Penstemon**
7b. Upper lobes of corolla fused into a galea enclosing the stamens
11a. Anthers symetrical, the two cells the same size **11. Pedicularis**
11b. Anthers asymetrical, one cell lower and often smaller

12a. Calyx 1-cleft (ventrally) nearly to base, thus spathlike; bracts usually not colored — 4. **Cordylanthus**
12b. Calyx 2 or 4 cleft half way to the base; bracts usually colored distally
  13a. Corolla pink to purplish, lower lip of inflated, nearly as long as the galea — 10. **Orthocarpus**
  13b. Corolla reddish, lower lip of corolla not inflated, less than one-fifth as long as galea — 2. **Castilleja**

1. **Antirrhinum** L.

1a. Pedicels more than 3 cm long at anthesis; inflorescence glabrous; stem twining, not self-supporting; capsule not oblique, dehiscing irregularly — 2. **A. kelloggii**
1b. Pedicels less than 1 cm long at anthesis; inflorescence glandular-pubescent; stems self-supporting; capsules oblique, dehiscing by terminal pores
  2a. Suffrutescent perennial; upper calyx lobe more than 9 mm long; twining branches lacking — 3. **A. multiflorum**
  2b. Annuals; upper calyx lobe less than 6 mm long; twining branches present
    3a. Corolla white; cauline leaves linear to lanceolate, several times longer than wide; inflorescence a dense spike, glandular pubescent and distinctly set off from the glabrous stem — 1. **A. coulterianum**
    3b. Corolla blue-purple; cauline leaves ovate, only slightly longer than wide; inflorescence and stem not sharply distinct, both glandular-pubescent — 4. **A. nuttallianum**

1. **A. coulterianum** Benth. Annual, up to 1.5 m tall; corolla white. Chaparral, especially on burns; from Lake Sherwood eastward, away from the coast and below 2000 ft. 4-6.

2. **A. kelloggii** Greene. Annual, 3-10 dm tall, upper parts twining; corolla blue. Coastal sage scrub and chaparral, burns. Occasional throughout the mountains, except the western end, and below 2000 ft.

3. **A. multiflorum** Penn. Bush Snapdragon. Annual or short-lived perennial, 2-3 m tall, glutinous; corollas lavender. In chaparral and on burns, occasional from Sepulveda Canyon westward; not on the immediate coast. 5-8.

4. **A. nuttallianum** Benth. Annual or biennial, up to 1 m tall; corolla blue-purple or violet. Coastal sage scrub and chaparral, especially on burns; from Decker Canyon to Sepulveda Canyon on the south face of the mountains below 2000 ft. 4-6.

2. **Castilleja** Mutis ex L. Indian Paint Brush

1a. Plants annual; bracts entire; calyx green; growing along streams — 4. **C. stenantha**
1b. Plants perennial; bracts lobed; calyx red distally; growing on dry slopes
  2a. Leaves and stems white-tomentose with branched hairs — 2. **C. foliolosa**
  2b. Leaves and stems not white-tomentose, hairs unbranched
    3a. Plant not glandular-pubescent below inflorescence; calyx 18-30 mm long, lateral cleft 3 mm long or more — 1. **C. affinis**
    3b. Plants glandular-pubescent below inflorescence; calyx 10-16 mm long, lateral cleft 2 mm long or less — 3. **C. martinii**

1. **C. affinis** H. & A var. **contentiosa** (Macbr.) Munz. Slender perennial ± woody at base; stems purplish, up to 5 dm tall; bracts and calyces distally scarlet; lower corolla lip dark green to brownish. Open grassy areas and among shrubs, coastal sage scrub and chaparral throughout, below 2000 ft. 2-5.

2. **C. foliolosa** H. & A. Suffrutescent perennial, to 5 dm tall; bracts and clyces distally scarlet; lateral calyx cleft 0.5 mm long or less; corolla galea greenish with pale, thin reddish margins. Open, rocky areas in chaparral; Saddle Peak area and eastward, away from the coast. 2-4.

3. **C. martinii** Abrams. [**C. roseana** Eastw., **C. gyroloba** Penn.] Similar to **C. affinis.** Open, sandstone area in chaparral just west of Cahuenga Pass; north-facing slopes of Boney Mountain. 4-5.

4. **C. stenantha** A. Gray. Erect, slender annual, usually not branched, up to 15 dm tall; calyx green; corolla with dull reddish-yellow galea and yellow lower lip. Moist streambeds, scattered in the western half of the mountains away from the immdeiate coast and below 2000 ft. 5-6.

3. **Collinsia** Nutt.

1a. Flowers in whorls; pedicels less than 1 cm long; corollas 15-20 mm long, pubescent 1. **C. heterophylla**
1b. Flowers not congested in whorls; pedicels more than 1 cm long; corollas 7-10 mm long, glabrous 2. **C. parryi**

1. **C. heterophylla** Buist. ex Grah. Chinese Houses. Annual, 2-5 dm tall; corolla with white to lilac upper lip and violet or rose-purple lower lip. Southern oak woodland and openings in chaparral. Occasional throughout the mountains below 2000 ft. 4-5.

2. **C. parryi** Gray. Annual, 1-5 dm tall; corolla lips violet-blue. Rare, known only from Soldier's Home (Sawtelle), Santa Monica; reported from Stokes Canyon; not collected since 1901. Also known from just north of the Santa Monica Mountains in the Simi Hills, Silvernale Ranch, Santa Susana Mountains, Ventura Co., **Kappler** (JEPS).

4. **Cordylanthus** Nutt. ex Benth.

1a. Leaves 3-lobed, with filiform lobes; inflorescence of capitate clusters; chaparral and southern oak woodland 1. **C. filifolius**
1b. Leaves simple, oblong-lanceolate; inflorescence spicate; salt marshes 2. **C. maritimus**

1. **C. filifolius** Nutt. ex Benth. Annual 3-9 dm tall; corollas white. Open grassy areas in chaparral and southern oak woodland; north Topanga Canyon west to Boney Ridge, at high elevations and on the north side of the mountains away from the ocean. 6-9.

2. **C. maritimus** Nutt. ex Benth. Annual 2-4 dm tall; corolla purple on lower lobes and thin margin of galea. Coastal salt marsh; Mugu Lagoon, Pacific Coast Highway near Point Mugu, **Abrams 13692** (RSA); not known if it still occurs within the boundaries of this flora. 6-10.

5. **Diplacus** Nutt. Sticky or Bush Monkey Flower

1. **D. longiflorus** Nutt. [**Mimulus longiflorus** (Nutt.) Grant]. Shrub, 3-12 dm tall; corolla orange to pale yellow, 5-6 cm long; leaves sticky. Common in coastal sage scrub and chaparral throughout the area. 1-5.

6. **Keckiella** Straw

1. **K. cordifolia** (Benth.) Straw. [**Penstemon cordifolius** Benth.] Scandent shrub; corollas dark scarlet, 3-4 cm long, with tube little expanded distally; leaves ovate, short petioled, 2-3(-4) cm long. Common in chaparral, coastal sage scrub, and southern oak woodland throughout. 3-6(-8).

7. **Linaria** Mill. Toadflax

1a. Corolla, including spur, 20-30 mm long, spur straight and nearly vertical; capsules 4-5 mm long 1. **L. pinifolia**
1b. Corolla, including spur, 12-16 mm long, spur curved; capsule 2-3 mm long 2. **L texana**

1. ***L. pinifolia** (Poir.) Thell. Annual 2-6 dm tall; corolla purple and yellow. Rare weed of roadsides in chaparral, Decker Road summit. 4-5. Native of southern Europe.

2. **L. texana** Scheele. [**L. canadensis** (L.) Dum.-Cours. var. **texana** (Scheele) Penn.] Annual 2-6 dm tall; corollas blue-violet. Rare in sandy soil; Mandeville Canyon, Point Dume. 2-4.

8. **Mimulus** L. Monkey Flower

1a. Corolla scarlet; anthers pubescent	2. **M. cardinalis**
1b. Corolla yellow; anthers glabrous	
2a. Pedicels half as long as calyx	1. **M. brevipes**
2b. Pedicels as long as or longer than calyx	
3a. Lower leaves lanceolate-oblong, sessile; plant shaggy-villous	5. **M. pilosus**
3b. Lower leaves ovate, rounded, petiolate; plant not shaggy-villous	
4a. Calyx inflated, upper teeth much longer than lower teeth; upper leaves connate	4. **M. guttatus**
4b. Calyx not inflated, calyx teeth equal in length; upper leaves short petioled	3. **M. floribundus**

1. **M. brevipes** Benth. Viscid-pubescent annual, 1-8 dm tall; corolla 2.5-4.5 cm long, yellow. In chaparral and on burns throughout the mountains below 2000 ft; generally away from the ocean. 4-5.

2. **M. cardinalis** Dougl. ex Benth. Viscid-villous, herbaceous perennial; stems erect or prostrate, 2.5-8 dm long; corolla scarlet, 4.5 cm long, upper lobes ascending, lower reflexed. Along streams, Topanga Canyon and westward, below 2000 ft. 5-10.

3. **M. floribundus** Dougl. ex Lindl. Viscid-villous annual; corolla 5-12 mm long, yellow. Rare, sandy flats along stream; Franklin Canyon, Santa Ynez Canyon.

4. **M. guttatus** Fisch. ex DC. Annual or herbaceous perennial, sometimes rooting at nodes; corolla yellow. Occasional in moist areas throughout the mountains below 2000 ft. 3-8.

5. **M. pilosus** (Benth.) S. Wats. White villous annual, 5-35 cm tall; corolla 7-8 mm long, yellow. Moist areas in southern oak woodland and chaparral. Rare in the western half of the mountains away from the coast; more common after fire. 4-5.

9. **Orobanche** L. Broomrape

1a. Flowers solitary on long naked pedicels that are longer than the corollas, without bracts at base of calyx; corolla lobes orbicular	
2a. Caudex somewhat woody, with 5-10 firm bracts and several axillary pedicels that are rarely longer than the caudices; calyx lobes equal to or shorter than the calyx tube	3. **O. fasciculata**
2b. Caudex soft herbaceous, with 1 to several greatly elongated pedicels from the axils of the few basal bracts; calyx-lobes longer than the calyx tube	4. **O. uniflora**
1b. Flowers densely spicate, sessile or on pedicels shorter than the corolla, with 2 bracts at the base of the calyx; corolla lobes tapered to a pointed or rounded apex	
3a. Stems arising from an enlarged tuberlike thickening	1. **O. bulbosa**
3b. Stems not arising from an enlarged tuberlike base	
4a. Corolla 25-50 mm long; corolla lips 10-14 mm long, widely spreading	2. **O. californica**
4b. Corolla 15-15 mm long; corolla lips 4-10 mm long, erect to spreading	5. **O. vallicola**

1. **O. bulbosa** Beck. Fleshy-stemmed, parasitic herb, to 2 dm tall, from a thickened tuberlike base; inflorscence densely pyramidal, thyrsoid-paniculate; flowers nearly or quite sessile; calyx ca 1 cm long, unequally cleft; corolla 10-15 mm long, yellowish to purplish, or brownish; anthers glabrous or subglabrous. Dry chaparral, parasitic on roots of various shrubs, usually on **Adenostoma fasciculatum**. Rare, Topanga Canyon. 4-10.

2. **O. californica** C. & S. subsp. **grandis** Heckard. Root parasite, 8-30 cm tall; stems to 18 cm long below the subcapitate or subcorymbose inflorescence; calyx ca 12-16 mm long, lobes 10 mm or more long; corolla 25-30 mm long, tube buff or yellowish, lips pinkish or pale brownish red with darker veins; anthers with wooly hairs. Reportedly parasitic on **Adenostoma fasciculatum**, **Haplopappus venetus**, **Heterotheca**, and **Artemisia**. Dry chaparral, usually on **Adenostoma fasciulatum**. Rare,

3. **O. fasciculata** Nutt. Purplish plants lacking chlorophyll; caudex 3-10 mm thick, 3-12 cm long, somewhat woody, with 5-12 bracts; flowers several, solitary on long pedicels; corolla usually

purplish. Parasitic on **Artemisia**, **Eriogonum**, **Eriodictyon**, etc. Rare, Cornell Corners.

4. **O. uniflora** L. subsp. **occidentalis** Ferris. Root parasite; stems 2-4 mm thick, 0.5-5 cm long, largely subterranean with 2-6 crowded bracts; flowers 1-3, solitary on long pedicels; corolla usually deep purple. Largely parasitic on Saxifragaceae. Rare, Malibu Creek, growing near **Dudleya cymosa**.

5. **O. vallicola** (Jeps.) Heckard. [**O. californica** var. **claremontensis** Munz]. Root parasite, 1-3 dm tall; inflorescence spicate or paniculate; flowers crowded; corolla pale, veins darker. Rare, Santa Monica Canyon, **Barber** (UC). 7.

10. **Orthocarpus** Nutt. Owl's-Clover

1a. Galea straight at tip, pubescent	1. **O. densiflorus**
1b. Galea hooked at tip, densely bearded	2. **O. purpurascens**

1. **O. densiflorus** Benth. var. **densiflorus**. Similar to **O. purpurascens**. Rare, Santa Monica, fields, **Crawford** in 1916 (POM).

2. **O. purpurascens** Benth. var. **purpurascens**. Erect annual, 1-4 dm tall; inflorescence clubshaped; bracts and calyx-lobes purple or reddish-purple. Openings in chaparral, burns and areas along the coast; occasional throughout, below 2000 ft. Plants with lower corolla white or pale yellow are var. **pallidus** Keck.

11. **Pedicularis** L.

1. **P. densiflora** Benth. ex Hook. Indian Warrior. Herbaceous perennial 1-4 dm tall; leaves twice pinnatifid; corollas dark red. Openings in chaparral, scattered throughout the mountains. 2-4.

12. **Penstemon** Mitch.

1a. Cauline leaves linear, fasciculate, less than 6 mm wide	2. **P. heterophyllus**
1b. Cauline leaves lanceolate to ovate, more than 1.5 cm wide	
2a. Leaves toothed; corolla blue distally	4. **P. spectabilis**
2b. Leaves entire; corolla scarlet or red-purple distally	
3a. Corolla red-purple with lobes more than 4 mm long and tube 7-9 mm wide when pressed	3. **P.** X **parishii**
3b. Corolla scarlet with lobes less than 3 mm long and tube 5-6 mm wide when pressed	1. **P. centranthifolius**

1. **P. centranthifolius** Benth. Scarlet Buglar. Perennial, 3-12 dm tall; corolla scarlet, 2.5-3.5 cm long, with tube little expanded distally; upper leaves auriculate-clasping, glaucous. Occasional in southern oak woodland and chaparral below 2000 ft; northern and eastern portion of the mountains away from the coast. 4-5.

2. **P. heterophyllus** Lindl. subsp. **australis** (Munz & Johnst.) Keck. Perennial, woody at base; corolla tube expanded distally, 2.5-3.5 cm long, blue or purple. Occasional in southern oak woodland and chaparral below 2000 ft. From Lake Sherwood to Sepulveda Canyon, back of the immediate coast. 4-6.

3. **P.** X **parishii** Gray. Habit of **P. centranthifolius**; corolla red-purple. A hybrid between **P. spectabilis** and **P. centranthifolius** occuring occasionally where the parents grow together. Southeast of Calabasas. 5.

4. **P. spectabilis** Thurb. ex A. Gray subsp. **subviscosus** Keck. Perennial, 8-12 dm tall; corolla lavender-purle with blue lobes, 2.5-3.5 cm long, with tube expanded distally, upper leaves connate-perfoliate. Open slopes in coastal sage scrub and chaparral, Cold Canyon and eastward, away from the coast. 4-5.

13. **Scrophularia** L. Figwort

1. **S. californica** Cham. & Schlecht. subsp. **californica**. Herbaceous perennials 1-2 m tall; leaves triangular-ovate, petioled, 3-8 cm long; corolla red-brown to maroon. Moist areas in southern oak

woodland, coastal sage scrub, and chaparral throughout the area below 2000 ft. 3-6.

14. **Veronica** L. Speedwell

1a. Perennials; main stem with lateral racemes below terminal raceme 1. **V. anagallis-aquatica**
1b. Annuals; main stem without lateral racemes below terminal raceme 2. **V. persica**

1. ***V. anagallis-aquatica** L. Brooklime. Herbaceous perennial; cauline leaves cordate-clasping; corolla 4-5 mm across, pale lavender with violet lines. Occasional by lakes and streams below 2000 ft in the central part of the mountains. 5-10. Native of Old World.

2. ***V. persica** Poir. Annual, usually with several procumbent stems; leaves petioled; corolla deep blue, 7-11 mm across. Waste places. Native of Europe.

SIMAROUBACEAE Quassia Family

1. **Ailanthus** Desf. Tree-of-Heaven

1. ***A. altissima** (Mill.) Swingle. Tree; leaves odd-pinnate, to 6 dm long; leaflets lanceolate of oblong, acuminate, with 2-4 teeth near base; flowers greenish yellow, in large terminal panicles; fruit a linear or oblong samara. A noxious invasive species, well established on the inland side of the range below 2000 ft. 5-6. Native of southeast Asia, introduced in the gold rush days by Chinese laborers.

SOLANACEAE Nightshade Family

1a. Spiny shrub with water-filled bladder-like leaves 5-10 mm long, mostly clustered on short side branches 2. **Lycium**
1b. Plants herbaceous or suffrutescent, if spiny then not shrubs; leaves not bladder-like
2a. Corollas rotate; stamens exposed; fruit a berry
3a. Anthers dehiscing by terminal pores; if flowers yellow, then prickly 7. **Solanum**
3b. Anthers dehiscing by longitudinal slits; yellow flowers; not prickly 3. **Lycopersicon**
2b. Corollas tubular; stamens enclosed; fruit a berry or capsule
4a. Corollas over 2 cm long
5a. Fruit a smooth capsule; shrubs or herbs with flowers in racemes or panicles 4. **Nicotiana**
5b. Fruit a spiny capsule; herb with solitary axillary flowers 1. **Datura**
4b. Corollas under 1 cm long
6a. Prostrate annual of wet places; fruit a capsule 5. **Petunia**
6b. Erect clambering weedy perennial; fruit a berry 6. **Salpichroa**

1. **Datura** L. Jimson-Weed

1a. Corolla 15-20 cm long; perennial; capsule nodding 1. **D. innoxia**
1b. Corolla 6-8 cm long; annual; capsule erect 2. **D. stramonium**

1. **D. innoxia** P. Mill. [**D. wrightii** Regel., **D. meteloides** auct. non A. DC.] Coarse bushy perennial herb, to 1 m tall, the stems sprawling; leaves 4-15 cm long, 4-8 cm wide, covered with short gray pubescence; corolla white; capsule ca 2.5 cm in diameter. Common throughout in disturbed soil or coastal sage scrub at low elevations, often along roadsides. Poisonous. 1-12.

2. ***D. stramonium** L. Erect annual to 1 m tall; leaves 5-20 cm long, subglabrous; corolla white; capsule 4-5 cm long. Waif in orchards, gardens, and about fields. Poisonous. Summer. Native of tropical America.

2. **Lycium** L.

1. **L. californicum** Nutt. ex A. Gray. Densely branched, to 1 m tall; corollas white with purplish tinge; lobes ca 2 mm long; fruit a bright red berry. Rare on coastal bluffs; mouth of Latigo

Canyon, Charmlee County Park, vicinity of Santa Monica (where probably extirpated). The northernmost mainland localities for this species. 1-3.

3. **Lycopersicon**

1. ***L. esculentum** Mill. [**Solanum lycopersicum** L.] Tomato. Rank annual, covered with soft glandular pubescence and moist to the touch, with a strong odor; flowers nodding, axillary, the corolla deeply divided, yellow. Waif, occasionally escaped from cultivation in moist places along streams and lakes; Arroyo Sequit; Malibu Lake. Widely cultivated; related to species of western South America. 8-10.

4. **Nicotiana** L. Tobacco

1a. Subglabrous shrub or small tree with yellow flowers ca 2-3 cm long 1. **N. glauca**
1b. Glandular-pubescent rank annual with white flowers 4-7 cm long 2. **N. bigelovii**

1. ***N. glauca** Grah. Tree Tobacco. Fast-growing shrub or small tree up to 8 m tall; leaves mostly 4-7 cm long, 2-3 cm wide, narrowly ovate; petioles mostly 2-4 cm long; flowers in a loose leafy panicle, yellow. Common everywhere in disturbed soil and along streams. 1-12. Native of Argentina and possibly Bolivia.

2. **N. bigelovii** (Torr.) S. Wats. Mostly 4-12 dm tall, ill-smelling; leaves 5-20 cm long; corolla white. Rare in disturbed soil or burns; Griffith Park, Malibu Creek, north of Lake Sherwood. 5-6.

5. **Petunia** Juss.

1. **P. parviflora** Juss. Glandular-puberulent annual; leaves 4-12 mm long, 1-2 mm wide; corolla purplish with whitish tube; capsule 1.8-3 mm long. Marshy ground, Malibu Lake. 7-10.

6. **Salpichroa** Miers

1. ***S. origanifolia** (Lam.) Baill. [**S. rhomboidea** (Gill. & Hook) Miers.] Lily-of-the-Valley Vine. Scrambling perennial, usually growing up through other bushes; leaves ovate, 1-3 cm long, 0.5-1 cm wide; corollas white; style ca 6 mm long; berry yellow, ca 1 cm. long. Occasional weed near cultivated areas and in vacant lots, Santa Monica. 5-10. Native of South America.

7. **Solanum** L. Nightshade

1a. Plants with sharp straight spines
2a. Blue-flowered perennial with simple leaves 3. **S. eleagnifolium**
2b. Yellow-flowered annual with compound leaves 1. **S. cornutum**
1b. Plants not spiny
3a. Corolla deeply 5-cleft, white or faintly purplish; plants herbaceous, not densely glandular-pubescent
4a. Mature stems densely covered with spreading hairs 5. **S. sarachoides**
4b. Mature stems sparsely pubescent
5a. Corolla lobes ca 2 mm long; anthers 1.2-1.4 mm long 4. **S. nodiflorum**
5b. Corolla lobes ca 5 mm long; anthers 2.5-4 mm long 2. **S. douglasii**
3b. Corolla shallowly 5-lobed, purplish or violet-blue; plants shrubby, densely covered with glandular-pubescence 6. **S. xantii**

1. ***S. coronutum** Lam. [**S. rostratum** Dunal.] Buffalo-Bur. Annual, densely covered with yellow spines; corolla yellow. Reported as a weed, Santa Monica. Summer. Native of the Great Plains.

2. **S. douglasii** Dunal. Somewhat woody puberulent perennial with scrambling stems; corolla whitish with greenish basal spots; berry black. Common throughout on brushy slopes or in disturbed ground at low elevations. 2-3.

3. ***S. eleagnifolium** Cav. Silverleaf-Nettle. Erect perennial from undergound rhizomes, forming large clumps to 1 m tall, silvery, densely covered with branched hairs; corollas blue-violet; berries brownish or yellow. Locally common in disturbed ground, Los Angeles and Santa Monica; Stokes Canyon. 5-8. Native of central United States and adjacent Mexico.

4. ***S. nodiflorum** Jacq. Subglabrous bushy annual; corolla white or faint purple; berries shiny black. Occasional weed mostly in shady waste places at low elevations throughout. 4-10. Native of the New World Tropics.

5. ***S. sarachoides** Sendt. ex Mart. Erect annual; corolla lobes ca 2mm long, white; berry yellowish. Weed about fields and cultivation, sporadic but widespread at low elevations. 5-1. Native of Brazil.

6. **S. xantii** A. Gray var. **intermedium** Parish. Distinctly woody perennial, to 1 m tall; leaves often truncate or cordate at base; corolla 1.5-2.5 cm across, deep violet to dark lavender; berries ca 7 mm in diameter. Common in coastal sage scrub or openings in chaparral throughout. 1-5.

TAMARICACEAE Tamarisk Family

1. **Tamarix** L. Tamarisk

1. ***T. ramosissima** Ledeb. Grayish green shrub or shrubby tree; leaves scalelike; flowers pink to white. Infrequent along Calleguas Creek just outside of our boundaries, expected within the range. Native to Asia.

TROPAEOLACEAE

1. **Tropaeolum** L. Nasturtium

1. ***T. majus** L. Garden Nasturtium. Fleshy sprawling or scrambling glabrous annual or perennial herb; leaves peltate; flowers 4-6 cm across, showy, yellow and red; sepals 5, one forming a spur. 1-12. Native of South America, widely cultivated. Occasionally adventive in moist places, especially along the coast.

URTICACEAE

1a. Plants with stinging hairs; leaves opposite
  2a. Plants perennial, 1-3 m tall; largest leaves 10-20 cm long; inflorescences about as long as their subtending leaf — 4. **Urtica dioica**
  2b. Plants annual, 2-5 dm tall; largest leaves usually less than 7 cm long; inflorescences compact, about as long as or even shorter than the petiole of their subtending leaf
    3a. Leaves laciniate-serrate; pistillate calyx of 4 lobes, 2 large and 2 small — 4. **Urtica urens**
    3a. Leaves crenate; pistillate calyx a tube constricted to a small opening at apex — 1. **Hesperocnide**
1b. Plants without stinging hairs; leaves alternate
  4a. Stems spreading or decumbent, not rooting at nodes; leaves petiolate, ca 1 cm long; flowers clustered — 2. **Parietaria**
  4b. Stems creeping, rooting at nodes; leaves nearly sessile, ca 4-5 mm long; flowers solitary — 3. **Soleirolia**

1. **Hesperocnide** Torr.

1. **H. tenella** Torr. Annual; stems weak, 2-5 dm long; calyx tubular, pubescent with uncinate hairs; plants otherwise mostly glabrous except for stinging hairs. Plants very much like the **Urtica urens** below. Moist slopes in chaparral and southern oak woodland below 2000 ft and away from the ocean. 4-5.

2. **Parietaria** L. Pellitory

1. **P. floridana** Nutt. Annual; stems procumbent, soft-hairy, 1-3 dm long; leaves broadly ovate. Occasional on moist slopes in southern oak woodland or chaparral below 2000 ft. 4-5.

3. **Soleirolia** Gaud.-Beaup.

1. ***S. soleirolii** (Req.) Dandy. [**Helxine soleirolii** Req.] Baby-Tears. Perennial, puberulent with soft hairs, forming dense mats; leaves suborbicular. Very wet ground, locally established along the margin of upper Franklin Canyon Reservoir, and found elsewhere around lawns and gardens. 5-10. Native of the Balearic Is., Corsica, Sardinia, and portions of Italy.

4. **Urtica** L. Nettle

1a. Perennial, 1-3 m tall; inflorescence elongate, about as long as subtending leaves 1. **U. dioica**
1b. Annual, 2-5 dm tall; inflorescences compact, shorter than petioles of subtending leaves 2. **U. urens**

1. **U. dioica** L. subsp. **holosericea** (Nutt.) Thorne. [**U. holosericea** Nutt.] Rank perennial with simple, erect stems; soft pubescent with an admixture of harsh stinging hairs also present. In very moist areas from Sepulveda Canyon westward, below 2000 ft. 6-10.

2. ***U. urens** L. Dwarf Nettle. Annual; calyx lobes large, with few hairs near margins, plants otherwise mostly glabrous except for stinging hairs. Very similar in general appearance to **Hesperocnide** above. Weed in moist places, Griffith Park. 1-4. Native of Europe.

VALERIANACEAE

1a. Corolla more than 1 cm long; stamen 1; perennial herb, usually more than 4 dm tall 1. **Centranthus**
1b. Corolla less than 5 mm long; stamens more than 1; slender annual usually less than 2 dm tall 2. **Plectritis**

1. **Centranthus** Neck. ex Lam. & DC.

1. ***C. ruber** (L.) DC. [**Kentranthus ruber** (L.) Druce.] Red Valerian. Perennial herb with several stems from base, glabrous, somewhat glaucous; leaves ovate to lanceolate, the middle cauline ones subtending fascicles of smaller, lanceolate leaves; calyx inrolled, expanding and forming a plumose pappus on the fusiform, unwinged fruit; corolla red to pink, occasionally white. Occasional throughout the area in moist situations. 4-6. Native of lands around the Mediterranean Sea.

2. **Plectritis** (Lindl.) DC.

1. **P. ciliosa** (Greene) Jepson subsp. **insignis** (Suksd.) Morey. Glabrous, unbranched annual; leaves obovate to oblanceolate; corolla pink to light red; fruits winged, circular in outline, but wings incurved to varying degrees and somewhat cup-shaped. In sparse grass in partial shade. Southern oak woodland at higher elevations and away from the coast, known only from the western portion of the range; Latigo Canyon, upper Malibu Creek.

VERBENACEAE

1a. Calyx 2-lobed; flowers in dense almost globose spikes; spreading perennial herb, rooting from nodes 1. **Phyla**
1b. Calyx 5-toothed; flowers in long slender terminal spikes; erect herbaceous perennial 2. **Verbena**

1. **Phyla** Lour.

1a. Leaves 4-8 cm long, most of the margin serrate 1. **P. lanceolata**
1b. Leaves 1-3 cm long, serrate on the distal half 2. **P. nodiflora**

1. **P. lanceolata** (Michx.) Greene. [**Lippia lanceolata** Michx.] Perennial; stems procumbent, rooting at nodes; corolla lavender, 2-3 mm long. Wet soil, Lake Sherwood. 5-10.

2. ***P. nodiflora** (L.) Greene var. **rosea** (D. Don) Moldenke. [**Lippia nodiflora** (L.) Michx. var. **rosea** (D. Don) Munz.] Garden Lippia. Matted perennial; stems somewhat woody; corolla lavender. Occasional in moist areas; Lake Sherwood, Malibu Creek. 5-10. Native of South America.

2. Verbena L.

1a. Nutlets without white papillae on inner surface, strongly reticulate on back at apex and striate below, the striae fading out toward base — 1. **V. lasiostachys**

1b. Nutlets with prominent white papillae on inner surface, weakly reticulate on back at apex and striate below, the striae becoming obscure toward base — 2. **V. robusta**

1. **V. lasiostachys** Link. Herbaceous perennial; stems 4-9 dm tall, villous throughout; leaves oblong to ovate, irregulary serrate to laciniate, sometimes 3 lobed, the largest 10-15 (20) cm long; corollas blue, about 4-5 mm long. Occasional in coastal sage scrub or grassy areas in chaparral or southern oak woodland; scattered throughout. 4-10.

2. **V. robusta** Greene. Very similar to **V. lasiostachys.** Occasional in moist places; Point Dume, Lake Sherwood. 5-6.

VIOLACEAE

1. Viola L. Violet

1. **V. pedunculata** T. & G. Johnny Jump-up, Wild Pansy. Perennial from a short rootstock; leaves deltoid, subcordate, crenate at margin; petals yellow with brown-purple lines. Colonial in grassy areas in chaparral and southern oak woodland below 2000 ft; scattered throughout, but not common. 2-4.

VISCACEAE Mistletoe Family

1. Phoradendron Nutt. Mistletoe

1a. Plants parasitic on **Platanus**, occasionally on **Juglans** — 1. **P. tomentosum**

1b. Plants parasitic on **Quercus** — 2. **P. villosum**

1. **P. tomentosum** (DC.) Engelm. ex A. Gray subsp. **macrophyllum** (Engelm.) Wiens. Woody, dioecious parasite forming more or less spherical masses of green stems and leaves, attached to the younger branches of trees; leaves 2.3-4.8 cm long, 1.5-2.9 cm wide; flowers sessile on a jointed rachis; staminate inflorescence with 2-7 segments; pistillate inflorescence with 2-5 segments; fruit glabrous or sometimes with a partial ring of several scattered hairs below the calyx. Occasional in the inland portions of the area wherever host trees occur

2. **P. villosum** (Nutt.) Nutt. subsp. **villosum.** Differing from the above primarily in host preference in our area, best distinguished by the following characteristics: a complete ring of hairs below the calyx; staminate inflorescence with no more than 4 segments, pistillate inflorescence with no more than 3 segments; leaves usually smaller, often somewhat thick and fleshy. Occasional in the inland protions of the area wherever host trees occur. 7-9.

VITACEAE Grape Family

1. Vitus L.

1. **V. girdiana** Munson. Deciduous, woody vine with tendrils; stems up to 6 m long; leaf blades broadly cordate, usually 8-16 cm wide, obscurely to distinctly lobed, irregularly dentate at margin, light gray pubescent on lower surface. Occasional in deep canyons; Malibu Canyon, Griffith Park. 5-6.

ZYGOPHYLLACEAE Caltrop Family

1. **Tribulus** L. Puncture Vine

1. ***T. terretris** L. Annual with trailing prostrate stems to 1 m or more in length; leaves even-pinnate, with 4-7 pairs of oblong leaflets; flowers solitary, axillary; petals yellow; fruit armed with 2-4 stout spreading spines. In waste places throughout. 4-10. Native of the Mediterranean region and western Asia.

Monocotyledoneae

Key to the families of Monocotyledonae

1a. Marsh or aquatic herbs; leaves frequently submerged or floating	
2a. Plants floating or submerged, supported by the water	
3a. Plants minute, thallus-like; leaves absent	Lemnaceae
3b. Plants larger, not thallus-like; leaves present	
4a. Leaves ribbon-like to filiform, not differentiated into petiole and blade	
5a. Perianth absent	
6a. Leaves alternate	
7a. Flowers hermaphroditic; stamens 2; carpels 4, free	Ruppiaceae
7b. Flowers unisexual; stamen 1; ovary 1-celled, styles 2	Zosteraceae
6b. Leaves opposite or verticillate	
8a. Ovule apical, pendulous; perennials	Zannichelliaceae
8b. Ovule basal, erect; annuals	Najadaceae
5b. Perianth present	Potamogetonaceae
4b. Leaves not ribbon-like or filiform, usually differentiated into petiole and blade	Potamogetonaceae
2b. Plants in marshes or partially submerged, but not floating; leaves mostly basal	
9a. Perianth absent, or reduced to scales or bristles	
10a. Flowers in dense cylindrical spikes, the upper flowers staminate; ovary stipitate; stem jointless, terete	Typhaceae
10b. Flowers not in dense cylindrical spikes, ovary sessile; stem absent or present, and usually jointed	
11a. Stems solid, usually 3-angled; leaves usually with closed sheaths; fruit an achene	Cyperaceae
11b. Stem hollow, usually terete; leaves usually with open sheaths; fruit a caryopsis	Poaceae
9b. Perianth present	
12a. Perianth of dissimilar segments, the 3 outer sepaloid, the inner petaloid	Alismataceae
12b. Perianth of similar segments, sometimes petaloid	
13a. Ovary 3-celled or 1-celled with 3 parietal placentae	Juncaceae
13b. Ovary of 3-6 carpels, united to a central axis and splitting apart at maturity	Juncaginaceae
1b. Terrestrial herbs or shrubs, never aquatic	
14a. Perianth absent or reduced to scales or bristles	
15a. Flowers in dense cylindrical spikes, upper flowers staminate; ovary stipitate	Typhaceae
15b. Flowers not in dense cylindrical spikes, ovary not stipitate	
16a. Stems solid, usually 3-angled; leaves usually with closed sheaths; fruit an achene	Cyperaceae
16b. Stems hollow, usually terete; leaves usually with open sheaths; fruit a caryopsis	Poaceae
14b. Perianth present	
17a. Ovary superior	

18a. Perianth sepaloid; grass-like herbs or shrubs	Juncaceae
18b. Perianth petaloid, usually showy; plants not grass-like	
19a. Inflorescence umbellate	Alliaceae
19b. Inflorescence not umbellate	
20a. Plants with fibrous, sword-like leaves about 1 m long; flowers white or creamy, 2.5-3.5 cm long in panicles	Agavaveae
20b. Plants not as above	
21a. Styles 3, distinct to the base	Melanthaceae
21b. Styles 1, sometimes lobed at summit	
22a. Outer perianth segments narrow and sepal-like	Calochortaceae
22b. Outer perianth segments resembling inner ones	
23a. Leaves cauline	Liliaceae
23b. Leaves mostly at base	Hyacinthaceae
17b. Ovary inferior	
24a. Fertile stamens 1	Orchidaceae
24b. Fertile stamens 3	Iridaceae

AGAVACEAE Agave Family

1. **Yucca** L.

1. **Y. whipplei** Torr. subsp. **intermedia** Haines. Our Lord's Candle. Rosulate shrub with sword-like leaves and erect flowering stalks ca 3 m tall; flowers creamy white. Abundant in coastal sage scrub and about the edges of chaparral and southern oak woodland throughout; ascending to 2500 ft elevation. 4-7.

ALISMATACEAE Water-Plantain Family

1a. Fruit a ring of beakless achenes; innermost pair of secondary leaf veins diverging from the mid-vein well above the base of the blade	1. **Alisma**
1b. Fruit a subglobose cluster of beaked achenes; innermost pair of secondary leaf veins diverging from the mid-vein at the base of the blade	2. **Echinodorus**

1. **Alisma** L. Water-Plantain

1. **A. plantago-aquatica** L. [**A. triviale** Pursh]. Perennial herb; scapes up to 1 m tall; petals white. Wet soil of stream beds; Triunfo Creek, Malibu Creek. 7-9

2. **Echinodorus** Pich. ex Engelm. Bur Head

1. **E. rostratus** (Nutt.) Engelm. [**E. berteroi** (Spreng.) Fassett]. Herbaceous; scapes usually 2-8 dm tall; petals white. In moist sandy soil of lake margins; Lake Sherwood, Lake Eleanor.

ALLIACEAE Onion Family

1a. Flowers yellow	2. **Bloomeria**
1b. Flowers not at all yellow	
2a. Perianth segments united into a distinct tube; plants lacking odor of onions	
3a. Flowers tightly clustered with stalks mostly less than 6 mm long	4. **Dichelostemma**
3b. Flowers loosely clustered, their stalks mostly 1.5-5 cm long	3. **Brodiaeae**
2b. Perianth segments free or united only at the very base; plants with odor of onions	1. **Allium**

1. **Allium**

1a. Perianth segments white to rose, 6-8 mm long, acute	1. **A. haematochiton**
1b. Perianth segments deep rose-purple, 10-13 mm long, acuminate	2. **A. peninsulare**

1. **A. haematochiton** S. Wats. Perennial; bulb stout, elongate, tapering gradually to the stem; leaves with membranous sheaths about 15 mm wide encircling base of stem; perianth segments white to rose with darker midvein. Local, shallow soil over rocks in grassland above 1600 ft from Saddle Peak to Boney Ridge. 3-5.

2. **A. peninsulare** Lemmon. Perennial; bulb globose, about 1-1.5 cm long; leaf sheaths less than 5 mm wide; perianth segments deep rose-purple. Rocky slopes in grassland or open southern oak woodland, local; Griffith Park, vicinity of Lake Sherwood, Conejo Grade. 4-6.

2. **Bloomeria** Kell.

1. **B. crocea** (Torr.) Cov. Golden Stars. Perennial from fibrous-coated corm, mostly 3-6 dm tall; leaves basal, grass-like; flowers ca 20 mm across, each perianth segment orange-yellow, lined with brown. Frequent at low elevations in southern oak woodland or disturbed chaparral, mostly away from the coast throughout. 4-6.

3. **Brodiaea** Sm.

1. **B. jolonensis** Eastw. Scapose, perennial with corm; flowers mostly 10-14 mm long, violet. Rare, open clay flats in the central part of the mountains away from the coast. 4-5.

4. **Dichelostemma** Kunth

1. **D. pulchellum** (Salisb.) Heller. [**Broadiaea pulchella** (Salisb.) Greene, **B. capitata** Benth.]. Erect perennial with wiry scapes arising from clusters of grass-like leaves; leaves ca 5-10 mm wide; stems mostly 4-8 dm tall; corms with brown fibrous coat; flowers mostly less than 10 mm long. Common in coastal sage scrub and grassland throughout. 2-5.

CALOCHORTACEAE

1. **Calochortus** Pursh Mariposa Lily
(Key prepared by Albert Hill)

1a. Flowers nodding, subglobose	1. **C. albus**
1b. Flowers erect, campanulate	
2a. Petals solid yellow, often with brown markings near base	3. **C. clavatus**
2b. Petals not solid yellow, although some species have yellow markings	
3a. Petals densely bearded on lower 1/2 to 2/3, mostly above the gland, with yellow to purplish hairs; gland surface naked although surrounded by a dense fringe of hairs	4. **C. plummerae**
3b. Petals bearded to nearly glabrous on lower portion near gland; gland surface densely hairy	
4a. Petals uniform pink to bluish, without prominent dark blotch although often with gland darker	5. **C. splendens**
4b. Petals with prominent blotch near base or center	
5a. Petals with dark red blotch at base only, surrounding gland; capsule obtuse below persistent stigma	2. **C. catalinae**
5b. Petals with dark blotch near center, blotch red often accompanied by yellow; capsule acute below stigma	6. **C. venustus**

1. **C. albus** Dougl. ex Benth. Fairy Lantern, Globe-Lily. Slender, erect perennial; leaves broad, 1-5 cm wide; petals ciliate, white or somewhat rosy. Locally in moist places, usually common in deep shade in southern oak woodland, north slope of central part of range. 4-5.

2. **C. catalinae** S. Wats. Perennial; stems erect, ± zigzag; petals white to lilac, usually with a purple spot at the base of each petal; fruit oblong, obtuse. Very common, mostly in grassland and

coastal sage scrub, and especially conspicuous after fires; at low elevations throughout. 3-5.

3. **C. clavatus** S. Wats. subsp. **pallidus** (Hoover) Munz. Robust, tall perennial; stems zigzag; flowers large, yellow, sometimes with reddish brown markings; gland densely covered with branched hairs. Occasional on dry slopes in open chaparral, coastal sage scrub, or southern oak woodland; away from the coast throughout. 4-6.

4. **C. plummerae** S. Wats. Slender, usually branched perennial; petals pale pink to deep rose, drying purplish, conspicuously bearded within with a broad band of long yellow hairs. Scattered and local on rocky slopes at low elevations away from the coast; throughout. 4-6.

5. **C. splendens** Dougl. ex Benth. Erect, branched perennial; petals lavender, sometimes with a purple spot at the base of each petal above the gland; capsule linear. Local on brushy slopes; Topanga Canyon, Malibu Canyon, Trancas Canyon. 5-6.

6. **C. venustus** Dougl. ex Benth. Erect, stiff perennial; flowers mostly 1-3; petals white with a dark blotch, sparsely covered with slender hairs; gland densely covered with short hairs. Local on open rocky slopes; near Camarillo, near Cornell Corners, Malibu Junction, rock outcrops and ridges east and west of Westlake Blvd. 5.

CYPERACEAE Sedge Family

1a. Spike solitary, terminal	3. **Eleocharis**
1b. Spikes more than one	
2a. Bristles present around achene	4. **Scirpus**
2b. Bristles absent	
3a. Scales of the spikelet 2 ranked	2. **Cyperus**
3b. Scales of the spikelet not 2 ranked	
4a. Flowers unisexual; perennial	1. **Carex**
4b. Flowers perfect; annual	4. **Scirpus cernuus**

1. **Carex** L. Sedge

1a. Fruits densely hairy	5. **C. triquetra**
1b. Fruits not hairy	
2a. Spikelets sessile; plants with long rhizomes	2. **C. praegracilis**
2b. Spikelets stalked; plants clumped	
3a. Fruits with persistent, 3-parted style	4. **C. spissa**
3b. Fruits with deciduous, 2-parted style	
4a. Beak of fruit deeply bidentate, 0.5 mm long	1. **C. barbarae**
4b. Beak of fruit not bidentate, ca 0.25 mm long	3. **C. senta**

1. **C. barbarae** Dewey. Clumped perennial, to 1 m tall; leaves 3.5-9 mm wide; spikelets nodding, 2.5-8 cm long. Along streams, Franklin Canyon. 6-7.

2. **C. praegracilis** W. Boott. Perennial 2-7.5 cm tall, from long-creeping dark brown rhizomes; leaves to 3 mm wide. Scattered in seasonally moist flats at low elevations; Temescal Canyon west. 4-5.

3. **C. senta** W. Boott. Clumped perennial, to 1 m tall; leaves 3-5 mm wide; spikelets somewhat nodding, 2.5-5 cm long. Common along rocky streambeds in shade at low elevations, Topanga Canyon west. 3-5.

4. **C. spissa** Bailey. Clumped perennial, 1-2 m tall; leaves 7-14 mm wide; spikelets nodding, 3-14 cm long. Local in shaded places along streams at low elevations, Temescal Canyon west. 4-5.

5. **C. triquetra** W. Boott. Tufted perennial, 3-6 dm tall; leaves short, to 6 mm wide. Common on dry slopes in chaparral, up to 1700 ft elevation, vicinity of Saddle Peak east. 3-6.

2. **Cyperus** L. Umbrella Sedge

1a. Style bifid; achene 2-angled	5. **C. niger**
1b. Style trifid; achene 3-angled	
2a. Spikelets breaking into 1-fruited joints; achene enfolded by the firm rachis wings	6. **C. odoratus**
2b. Spikelets not breaking into 1-fruited joints	
3a. Rachis not winged	
4a. Spikelets 1-2 cm long	2. **C. eragrostis**
4b. Spikelets 0.5-1 cm long	1. **C. alternifolius**
3b. Rachis with a pair of membranous appendages at each node	
5a. Perennials; achenes obtuse	
6a. Scales dull yellow-brown	4. **C. esculentus**
6b. Scales shining red-brown	7. **C. rotundus**
5b. Robust annual; achenes mucronulate	3. **C. erythrorhizos**

1. ***C. alternifolius** L. Umbrella Plant. Clumped perennial, to 1.5 m tall. 1-12. Native of Africa. Often cultivated as an ornamental and rarely escaped, becoming established in wet places in and near the Los Angeles Basin.

2. **C. eregrostis** Lam. Robust perennial with short thick rhizomes; stems to 1 m tall. Occasional in wet places at low elevations near the coast and from Mandeville Canyon east. 6-11.

3. **C. erythrorhizos** Muhl. Caespitose annual, 1-10 dm tall. Locally abundant about lakes and sometimes along streams, north slope of western half of the range at low elevations. 7-11.

4. **C. esculentus** L. Yellow Nut-Grass. Perennial, to 5 dm tall, with short, tuber bearing runners. Rare, moist sand along Los Angeles River at Fletcher Ave. Bridge, **Ewan 7501** (LA). 6-7.

5. **C. niger** Ruiz & Pav. var. **capitatus** (Britt.) O'Neill. Short-rhizomatous perennial. Sand along Los Angeles River, **Braunton 566** (DS). 7-10.

6. **C. odoratus** L. [**C. ferax** L. C. Rich]. Robust annual; scales yellowish brown. Common in moist places, drainage of Malibu Creek. 7-10.

7. ***C. rotundus** L. Purple Nut-Grass. Perennial, much like **C. esculenta.** Rare weed about plantings, vicinity of Santa Monica, **Armacost 1295** (LA), and West Los Angeles. 6-7. Native of Eurasia.

3. **Eleocharis** R. Br. Spike Rush

1a. Achenes 3-angled; styles 3	2. **E. montevidensis**
1b. Achenes 2-angled; styles 2	
2a. Achenes with several longitudinal ridges and many horizontal lines; stems to 8 cm tall	3. **E. radicans**
2b. Achenes not longitudinally ribbed; stems from 3-10 dm tall	1. **E. macrostachya**

1. **E. macrostachya** Britt. in Sm. [**E. palustris** (L.) Roem. & Schult., **Heleocharis p.** (L.) Roem. & Schult.]. Perennial with tall spongy stems; spike 5-25 mm long. Occasional throughout in moist places, as around lakes, at low elevations. 5-10.

2. **E. montevidensis** Kunth. Perennial with wiry stems; spike 4-15 mm long. Occasional throughout in moist places at low elevations. 3-10. Plants with ovoid, blunt spikelets and 2-6 bristles per flower are var. **montevidensis.** Those with linear-lanceolate, acute spikelets and 6-7 bristles per flower are var. **parishii** (Britton) V. Grant [**E. parishii** Britton].

3. **E. radicans** (Poir.) Kunth. [**Heleocharis acicularis** (L.) Roem. & Schult. var. **radicans** (Poir.) Britt.]. Delicate inconspicuous perennial with soft, spongy stems; spike 2-4 mm long; stamens 2. Grassy patches on strand of Franklin Reservoir. 11.

4. **Scirpus** L. Bulrush, Tule

1a. Perennial; leaves not filiform	
2a. Stems sharply triangular in transection	
3a. Spikelet lateral, the stem continues beyond it	2. **S. americanus**
3b. Spikelet terminal, subtended by bracts	6. **S. maritimus**
2b. Stems rounded or somewhat triangular in transection	
4a. Involucral leaves 2-5	5. **S. microcarpus**
4b. Involucral leaves 1, appearing as a continuation of the stem	
5a. Rays of inflorescence with minute upward-directed teeth; inflorescence compact	1. **S. acutus**
5b. Rays of inflorescence smooth or nearly so; inflorescence loose	3. **S. californicus**
1b. Annual; leaves filiform	4. **S. cernuus**

1. **S. acutus** Muhl. Common Tule. Clumped perennial, up to 4 m tall; stems rounded. Rare in wet places; Los Angeles River, Malibu Lake. 4-10. Probably in part mistaken for **S. californicus** and not as rare as our records indicate.

2. **S. americanus** Pers. [**S. olneyi** A. Gray]. Perennial with long rhizomes; stems soft, spongy; inflorescence compact. Scattered along creeks, rivers, and lakes at low elevations. 4-10.

3. **S. californicus** (C. A. Mey.) Steud. Similar to **S. acutus**; stems obscurely triangular. Common in wet places at low elevations, Santa Monica and Topanga Canyon west. 4-10.

4. **S. cernuus** Vahl var. **californicus** (Torr.) Beetle. Tufted annual with filiform leaves and stems; spikelets 2-4 mm long. Moist places in the vicinity of Santa Monica, apparently not collected since 1904. 5-6.

5. **S. microcarpus** Prsl. Rare perennial with creeping rootstocks. In stream, Escondido Canyon. 9.

6. **S. maritimus** L. [**S. paludosus** A. Nels.] Tufted perennial with short rhizomes; stems hard, tough, spikes clustered. Frequent about coastal salt marshes and beaches near the coast; occasional along creeks and near lakes inland, Topanga Canyon west. 4-10.

HYACINTHACEAE

1. **Chlorogalum** Kunth Soap Plant

1. **C. pomeridianum** (DC.) Kunth. Bulb large, 7-15 cm long, heavily coated with dark brown fibers; leaves gray-green, basal, mostly 3-6 dm long, 1-2 cm wide, very wavy at margin; perianth segments white with green or purple midvein, about 2 cm long. Common throughout in coastal sage scrub or disturbed chaparral, especially prominent on burns. 5-6.

IRIDACEAE Iris Family

1. **Sisyrinchium** L.

1. **S. bellum** S. Wats. Blue-Eyed-Grass. Clumped perennial with grass-like leaves; stems mostly about 3-4 cm tall; flowers with 6 blue or violet perianth parts, 15-25 mm across. Common throughout at low elevations, mostly in grassland or coastal sage scrub, often in clay soil. 3-6.

JUNCACEAE Rush Family

1. **Juncus** L. Rush

1a. Plants annual	3. **J. bufonius**
1b. Plants perennial	
2a. Inflorescence apparently lateral; lowest involucral bract resembling a continuation of the stem, terete	
3a. Flowers inserted singly, each subtended by a pair of bractlets	

4a. Anthers about as long as the filaments; stems blue-green, densely clumped — 6. **J. patens**
4b. Anthers much longer than the filaments; stems not densely clumped
5a. Upper leaf sheaths usually with well-developed blades — 5. **J. mexicanus**
5b. Upper leaf sheaths lacking blades
6a. Capsules acute; stems to 8 dm tall — 2. **J. balticus**
6b. Capsules obtuse; stems 1-2 m tall — 8. **J. textilis**
3b. Flowers in small headlike bracteate clusters — 1. **J. acutus**
2b. Inflorescence terminal; the lowest involucral bract not resembling a continuation of the stem
7a. Leaves overlapping in 2 rangks as in **Iris**, the edge toward the stem marked with incomplete transverse septa
8a. Anthers much longer than filaments; capsule shorter than perianth segments — 7. **J. phaeocephalus**
8b. Anthers shorter than filaments; capsule longer than perianth segments — 10. **J. xiphioides**
7b. Leaves not overlapping in 2 ranks as in **Iris**
9a. Heads round, many-flowered; leaves terete, marked by complete transverse septa — 9. **J. torreyi**
9b. Heads 3-5 flowered; leaves flat, lacking septa — 4. **J. macrophyllus**

1. **J. acutus** L. var. **sphaerocarpus** Engelm. Large tufted perennial to 1.5 m tall with very sharp-pointed leaves. Frequent about seepages and by coastal salt marshes along the entire coast. 5-10.

2. **J. balticus** Willd. Rootstock stout, creeping perennial, 3-8 dm tall; stems terete, wiry; panicle dense to diffuse, many flowered; capsule ovoid, acute, mucronulate; seeds many-striate. Wet meadow, Lake Sherwood. 5-9.

3. **J. bufonius** L. Toad Rush. Diffusely branched annual, usually under 3 dm tall; leaves flat, 1 mm wide; inflorescence terminal; anthers ca as long as filaments; seeds minutely reticulate. Infrequent in low wet places. 4-6.

4. **J. macrophyllus** Cov. Tufted perennial; stiff subterete stems, 2-9 dm tall; leaves ± channeled; inflorescence a loose panicle of 8-25 heads, heads 3-5 flowered; inner perianth segments longer than outer; capsule obovoid, short beaked, shorter than perianth length; seeds with ca 20 ribs. Common throughout along streams at low elevations, in shade or sun. 6-8.

5. **J. mexicanus** Willd. Very similar to **J. balticus**; stems often twisted or compressed. Occasional about the borders of coastal salt marsh, and scattered in low, seasonally moist places inland. 5-9.

6. **J. patens** E. Mey. Tufted perennial; 4-8 dm tall; inflorescence an open or dense panicle; perianth segments subequal; capsules globose, slightly angled, length about equal to perianth length; seeds obscurely and irregularly reticulate. Seasonally moist open hillsides, colonial and widely scattered but found throughout the area at low elevations. 4-6.

7. **J. phaeocephalus** Engelm. var. **paniculatus** Engelm. Creeping perennial from stout rootstock, 3-9 dm tall; stems flat; inflorescence a loose panicle of many few-flowered heads; capsules oblong-ovoid, prominently beaked, length less than that of perianth; seeds reticulate, subtruncate at apex. Occasional in wet places; scattered throughout at low elevations. 5-7.

8. **J. textilis** Buch. Creeping perennial, stout rootstocks; stems pale, 1-2 m tall; distinctly striate with low flat ridges under a lens; inflorescence lax; perianth segments subequal or outer slightly longer than inner; capsules oblong to ovoid, length equal to or less than perianth length; seeds finely reticulate. Canyons of the Santa Monica Range, **Haase** in 1890 (DS); Trancas Canyon, **Kappler**.

9. **J. torreyi** Cov. Creeping perennial with slender rootsocks, 4-10 dm tall; outer perianth segments greater than inner; capsules subulate, length greater than or equal to length of perianth; seeds reticulate in ca 20 longitudinal row. Los Angeles River, **Braunton 559** (DS).

10. **J. xiphioides** E. Mey. Perennial with stout rootstocks, creeping, 5-9 dm tall; stems flat; inflorescence a compound panicle of many 3 to 20-flowered heads; capsule oblong, gradually con-

tracted into a beak; seeds reticulate. Common along streams, usually in sand, Topanga Canyon west in low elevations. 6-8.

JUNCAGINACEAE Arrow Weed Family

1. **Triglochin** L. Arrow Grass

1. **T. concinna** Davy var. **concinna.** Grass-like herbaceous perennial; leaves fleshy, ligulate at junction of sheath and obcompressed blade; scapes to 7 dm tall; racemes to 4 dm long; pedicels ascending; perianth segments 6; carpels and stigmas 6; fruit oblong-ovoid. Coastal salt marsh; Malibu, Point Mugu. 3-8.

LEMNACEAE Duckweed Family

1a. Rootlets present ... 1. **Lemna**
1b. Rootlets absent ... 2. **Wolffiella**

1. **Lemna** L. Duckweed

1a. Fronds long-stalked, 3-10 mm long, mostly submerged ... 3. **L. trisulca**
1b. Fronds not stalked, 0.5-5.5 mm long, floating
  2a. Fronds 3-5 nerved; rootlets to 15 cm long ... 1. **L. gibba**
  2b. Fronds obscurely 1-nerved; rootlets less than 1.5 cm long ... 2. **L. minor**

1. **L. gibba** L. Floating fronds rounded to obovate, 1-4 in a group; upper surface convex, the lower surface pale and somewhat gibbous. Rare in wet places in the Los Angeles basin and along the Los Angeles River.

2. **L. minor** L. [**L. cyclostasa** (Ell.) Chev.] Floating fronds thin, 1-8 in a group, oblong, subfalcate and asymmetrical. Rare; known from Malibu Lake and ponds in Fern Glen, Griffith Park.

3. **L. trisulca** L. Floating or more often submerged; fronds oblong to almost lanceolate, remaining connected and forming chainlike colonies, obscurely 3-nerved. Rare, in wet places along the Los Angeles River.

2. **Wolffiella** Hegelm.

1. **W. lingulata** (Hegelm.) Hegelm. Submerged; fronds oblong, tongue shaped, 3-8 mm long, 1.5-3 mm wide, occuring singly or rarely in twos, brown-punctate on both surfaces. Rare; in our area known only from Malibu Lake.

LILIACEAE Lily Family

1a. Flowers orange-red with maroon spots margined with red, the perianth segments 7-9 cm long ... 2. **Lilium**
1b. Flowers dark brown or dark greenish-purple, the perianth segments 2-3.5 cm long ... 1. **Fritillaria**

1. **Fritillaria** L.

1. **F. biflora** L. Chocolate Lily, Mission Bells. Perennial; bulb 15-20 mm thick; stems mostly 3-6 dm tall; leaves mostly 6-12 cm long, 2-4 cm wide, some of them whorled; perianth segments 2-3.5 cm long, dark brown, lined with green and purple inside. Local on clay slopes, often under shrubs, throughout. 2-4.

2. **Lilium**

1. **L. humboldtii** Roezl & Leicht. var. **ocellatum** (Kell.) Elwes. Perennial, up to 2 m tall; bulb ovoid, 5-15 cm long; leaves whorled; perianth segments recurved back from the stamens; stamens and

style about 5 cm long. Locally common along more or less shaded streams in southern oak woodland away from the immediate coast, vicinity of Rustic Canyon and westward. 5-6.

MELANTHACEAE

1. **Zigadenus** Michx.

1. **Z. fremontii** Torr. Star-Lily. Erect, to 1 m tall, from a large bulb up to 6 cm long; flowers creamy, each perianth segment 10-12 mm long, with a conspicuous greenish-yellow gland at base. Local in coastal sage scrub and chaparral at middle elevations away from the immediate coast throughout. 3-6.

NAJADACEAE Water-Nymph Family

1. **Najas** L.

1. **N. flexilis** (Willd.) Rostk. & Schmidt. Slender completely submerged annual with thin translucent leaves 1-2.5 cm long and 1-2 mm wide; pistillate flowers ca 3 mm long; stigmas 2-4, usually 3. Shallow water, Sawtelle, Santa Monica, **Hasse** in 1890 (DS).

ORCHIDACEAE

1a. Flowers few in a terminal, leafy-bracted raceme	1. **Epipactis**
1b. Flowers many in a slender spike	2. **Habenaria**

1. **Epipactis** Ws. Stream Orchid

1. **E. gigantea** Dougl. ex Hook. Leafy caulescent herb; stems erect, up to 10 dm high; lower leaves ovate, the upper lanceolate; flowers on pedicels 5-15 mm long; sepals and petals nearly equal, spreading; petals purplish or reddish. Moist places or along streams; Cahuenga Pass, Cold Creek, lower Arroyo Sequit, Santa Ynez Canyon. 4-5.

2. **Habenaria** Willd. Rein Orchid

2. **H. unalascensis** (Spreng.) S. Wats. Alaska Piperia. Simple erect herb up to 10 dm high; basal leaves lanceolate to oblanceolate, the upper ones greatly reduced in size; corolla spurred; bracts shorter than the greenish flowers. Recently burned southern oak woodland; upper Malibu Creek, Cold Creek, upper Solstice Canyon, Trancas Canyon. 4-5.

POACEAE Grass Family

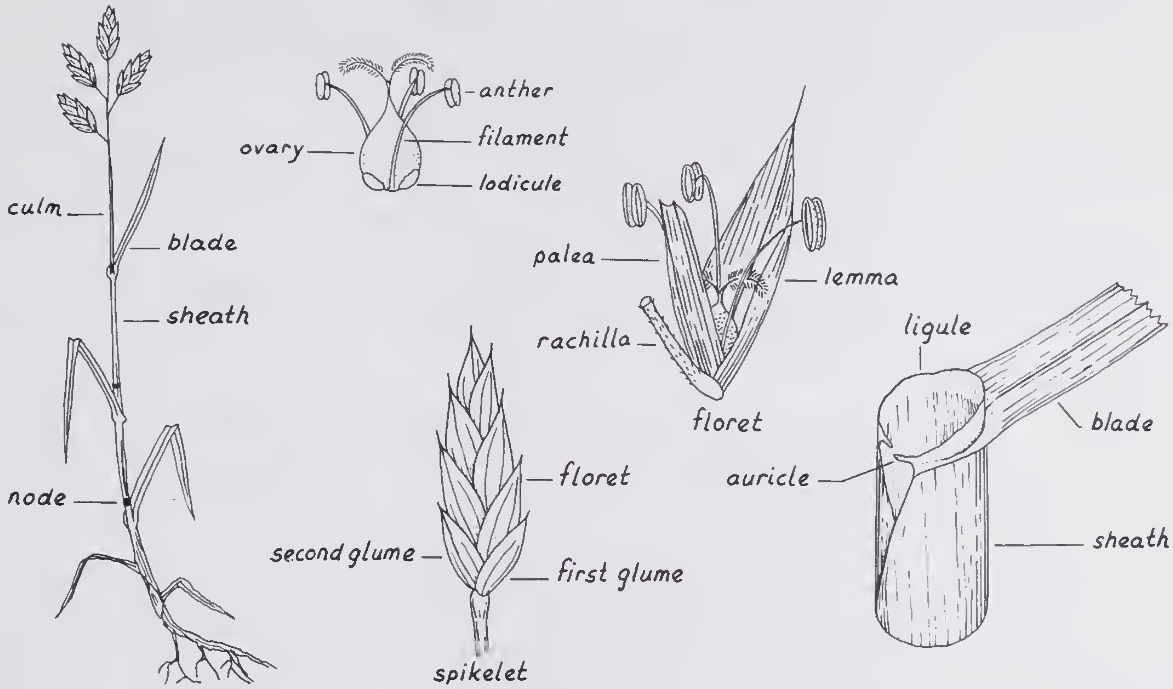

Figure 24. Generalized characteristics of the Poaceae

1a. Dioecious perennials with relatively stiff, 2-ranked leaves

2a. Spikelets 1-few, mostly concealed by leaves; leaves to 1 cm long, stiff; lemmas 3-nerved — 30. **Monanthochloe**

2b. Spikelets few-many, not concealed by leaves; leaves mostly over 3 cm; lemmas 9-11 nerved — 15. **Distichlis**

1b. Monoecious or hermaphroditic

3a. Spikelets often purplish, in pairs at each node of rachis, one member of each pair sessile, fertile, the other pedicellate, sterile; coarse rhizomatous perennials — 43. **Sorghum**

3b. Spikelets not as above

4a. Inflorescences entirely or almost entirely enclosed in inflated upper sheaths

5a. Matted annual of moist places, upper sheaths in opposite pairs — 13. **Crypsis**

5b. Stoloniferous perennial of dry soil, sheaths alternate — 35. **Pennisetum**

4b. Inflorescences not largely enclosed by inflated upper sheaths

6a. Awns trifid, mostly 1-1.5 cm long; annuals — 5. **Aristida**

6b. Awns not trifid, or absent

7a. Spikelets in fascicles of 2-4, one spikelet fertile with a single perfect and a rudimentary floret, each with a delicate awn at least 5 mm long; remaining spikelets of the fascicle entirely sterile, with numerous obtuse awnless lemmas — 26. **Lamarkia**

7b. Spikelets not as above, mostly monomorphic

8a. Spikelets sessile or nearly so, arising on one side or on opposite sides of the rachis

9a. Spikelets in one or more rows along only one side of rachis

10a. Inflorescence simple, a spike borne at the summit of an axillary branch; rachis conspicuously flattened, corky	45. **Stenotapharum**
10b. Inflorescence compound	
11a. Spikelets 6- to 12-flowered, elongate	27. **Leptochloa**
11b. Spikelets 1- to 2-flowered	
12a. Spikelets or racemes clustered at top of stems, in pairs or digitate	
13a. Awn present, 1-12 mm long	13. **Chloris**
13b. Awn absent	
14a. Ligule a dense fringe of hairs; glumes persistent on rachis, spikelets falling without them	14. **Cynodon**
14b. Ligule membranous; glumes falling with spikelets	
15a. Spikes or racemes paired (rarely in 3's); wet places	35. **Paspalum**
15b. Spikes or racemes digitate; dry places	16. **Digitaria**
12b. Spikes or racemes not clustered at top of stem	
16a. First glume about half the length of the spikelet, pointed; lemma hispid with short stiff bristles	18. **Echinochloa**
16b. First glume absent; lemma fringed with long white weak silky hairs	35. **Paspalum**
9b. Spikelets borne in two rows along opposite sides of axis of solitary spikes or racemes	
17a. Spikelets 1-flowered, sunken in hollows in jointed fragile axis; spikes slender, curved, cylindrical; lemmas enclosed by the glumes	34. **Parapholis**
17b. Spikelets appressed to the axis or spreading from it; spikes not cylindrical; lemmas exceeding the glumes	
18a. Spikelets with their narrower edges fitting into depressions in rachis, upper glume external, lower glume absent in all except terminal spikelets	28. **Lolium**
18b. Spikelets with their broader sides adjacent to the rachis, their glumes both developed, lateral	
19a. Spikelets normally solitary at each node of the rachis; annual	
20a. Plants annual	47. **Triticum**
20b. Plants perennial	1. **Agropyron**
19b. Spikelets two or more at each node of rachis	
21a. Spikelets three at each node of the rachis, the central one fertile, the lateral ones pedicellate, sterile, and reduced (sessile and fertile in **Hordeum vulgare**)	24. **Hordeum**
21b. Spikelets 1-many at each node of rachis, all fertile, often variable in number on an individual spike	20. **Elymus**
8b. Spikelets pedicellate, in panicles or rarely loose racemes; if in spikelike panicles, the spikelets crowded all around the rachis	

22a. Spikelets subtended by 1-many prominent bristles
23a. Bristles falling with the spikelets at maturity, plumose below — 36. **Pennisetum**
23b. Bristles persistent on rachis, scabrid — 42. **Setaria**
22b. Spikelets not subtended by prominent bristles
24a. Spikelets with two or more fertile florets
25a. Plants tall stout reeds with large plumelike panicles; lemma or rachilla with silky hairs as long as lemma
26a. Leaves crowded at base of culms — 12. **Cortaderia**
26b. Leaves distributed along the culms
27a. Ligule a ring of hairs; rachilla long pubescent; lemma naked — 38. **Phragmites**
27b. Ligule membranous, sometimes very short; rahcilla naked; lemma long pubescent — 6. **Arundo**
25b. Plants not reed like
28a. Both glumes, or upper only, as long as or longer than the lowest lemma and often as long as whole spikelet; lemmas awnless or awned from the back, awn usually bent
29a. Lemmas usually with an awn arising from back, glumes 2-3.5 cm long — 7. **Avena**
29b. Lemmas awnless, glumes 4-5.5 mm long
30a. Tufted perennial; lemmas entire at apex — 25. **Koeleria**
30b. Annual; lemmas minutely bifid at apex — 41. **Schismus**
28b. Glumes shorter than lowest lemma; lemmas awnless or awned from tip, awn straight
31a. Lemmas prominently 3-nerved, spikelets strongly compressed; plants annual — 21. **Eragrostis**
31b. Lemmas 5- to many-nerved, the nerves sometimes obscure
32a. Lemmas as broad as long, with outspread margins; florets closely imbricate, horizontally spreading — 9. **Briza**
32b. Lemmas longer than broad, the margins clasping the palea; florets not horizontally spreading
33a. Spikelets strongly compressed and crowded in one-sided clusters at the ends of stiff, naked panicle branches; tufted perennial — 14. **Dactylis**
33b. Spikelets not strongly compressed and crowded in 1-sided clusters
34a. Lemmas awned or awn-tipped from a minutely bifid apex
35a. Plants perennial, tufted
36a. Lemmas ca 6 mm long; panicle loose, somewhat drooping — 21. **Festuca**
36b. Lemmas 1-2 cm long — 10. **Bromus**
35b. Plants annual — 10. **Bromus**
34b. Lemmas awnless or awned from an entire apex

37a. Lemmas 2-4.5 mm long, awnless 39. **Poa**

37b. Lemmas 5-18 mm long, if smaller, then awned

38a. Plants perennial; anthers exserted at anthesis 22. **Festuca**

38b. Plants annual; anthers usually included at anthesis 48. **Vulpia**

24b. Spikelets with only one fertile floret

38a. Lemmas with a ring of hairs from the base; about 1/4 length of the lemma 3. **Ammophila**

38b. Lemmas without a conspicuous ring of hairs from the base, but sometimes long-hairy all over

39a. Lemma, rachis, and pedicels covered with hairs about as long as or longer than the lemma

40a. Pedicels, at least those above, and usually upper rachis internodes, with central groove or membranous area 8. **Bothriochloa**

40b. Pedicels and rachis internodes flat or rounded, without central groove or membranous area 4. **Andropogon**

39b. Rachis and pedicels, and often lemma, glabrous or short-pubescent

41a. Awns present, at least 2.5 cm long; perennials 46. **Stipa**

41b. Awns absent or less than 1.5 cm long

42a. One or two sterile or staminate lemmas present below the fertile lemma; lemmas awnless

43a. Spikelets congested into a rounded spike 37. **Phalaris**

43b. Spikelets in a more or less open panicle

44a. Coarse villous annual 33. **Panicum**

44b. Essentially glabrous perennial 19. **Ehrharta**

42b. Sterile lemmas absent

45a. Glumes shorter than the lemma

46a. Spikelets ca 2 mm long; lemmas 1-nerved; grain falling readily from the spikelets at maturity; perennial 44. **Sporobolus**

46b. Spikelets 2.5-3.5 mm long; lemmas 3-nerved toward the summit; grain persistent at maturity; annual or perennial 31. **Muhlenbergia**

45b. Glumes equal to or longer than the lemma

47a. Glumes conspicuously awned from the tip 40. **Polypogon**

47b. Glumes not awned

48a. Annual; glumes membranous, shining and swollen at the base; lemmas pubescent, with a delicate awn ca 5 mm long 23. **Gastridium**

- 48b. Perennial; glumes not swollen at base; lemmas glabrous
  - 49a. Awn straight, terminal, ca 4 mm long, about twice the length of the lemma — 32. **Oryzopsis**
  - 49b. Awn wanting or geniculate, dorsal, up to the length of the lemma
    - 50a. Lower glume prominently 3-nerved, scarious; spikelets often purplish; tufted perennial of dry hillsides — 29. **Melica**
    - 50b. Lower glume 1-nerved; spikelets not purplish — 2. **Agrostis**

1. **Agropyron** Gaertn. Wheat Grass

1. **A. parishii** Scribn. & Sm. var. **laeve** Scribn. & Sm. [**Elymus pauciflorus** (Schwein.) Gould subsp. **laeve** (Scribn. & Sm.) Gould]. Wiry; gray-green. Clumps in chaparral on east side of Sandstone Peak, 2400 ft. 5-6.

2. **Agrostis** L. Bent Grass

- 1a. Palea absent; plants lacking stolons, forming clumps
  - 2a. Plants spreading by creeping rhizome — 1. **A. diegoensis**
  - 2b. Plants without rhizome — 2. **A. exarata**
- 1b. Palea present, about 2/3 the length of the lemma; plants spreading by leafy stolons and forming a turf
  - 3a. Panicle branches in dense verticels; panicle contracted and densely flowered; glumes 2 mm or less long — 3. **A. semiverticellata**
  - 2b. Panicle branches not in dense verticels; glumes 2 mm or more long — 4. **A. stolonifera**

1. **A. diegoensis** Vasey. Rhizomatous perennial; culms erect, 4-10 dm tall. Scattered on dry hillsides in coastal sage scrub, chaparral, and southern oak woodland, eastern and central parts of the mountains below 2000 ft. 5-6.

2. **A. exarata** Trin. Tufted perennial, 2-12 dm tall. Moist, open places; intermittent streambed, riparian woodland.

3. ***A. semiverticillata** (Forsk.) Christ. [**Polypogon semiverticillatus** (Forsk.) Hyl.]. Frequent in more or less sunny moist places throughout, below 2000 ft. 5-11. Native of the Mediterranean region.

4. ***A. stolonifera** L. [**A. alba** in sense of most authors; **A. palustris** Huds.]. Creeping Bentgrass. Occasional perennial weed, spreading from lawns in the area of Santa Monica and West Los Angeles; rare elsewhere about lawns or in moist places. 6-8. Circumboreal.

3. **Ammophila** Host.

1. ***A. arenaria** (L.) Link. Beachgrass. A stout perennial with involute blades and tough scaly rhizomes; culms 0.6-1 m tall. Planted and naturalized along the beach in the southern part of Santa Monica. 5-7. Native of the coasts of western Europe.

4. **Andropogon** L.

1. **A. glomeratus** (Walt.) B.S.P. Bushy Bluestem. Perennial, 5-10 dm tall; leaf blades very sharply keeled on back, 3-6 mm wide. Shaded creek bottom, Arroyo Sequit. 10-11.

5. **Aristida** L.

1. **A. adscensionis** L. Six-week Threeawn. Tufted annual, 1-4 dm tall; spikelets with a purplish tinge; panicle narrow; glumes 5-10 mm long; lemma 6-9 mm long. Burned rocky slopes in chaparral, Arroyo Sequit. 4-5.

6. **Arundo** L.

1. ***A. donax** L. Giant Reed. Very stout, tall perennial, to 8 m tall; spikelets ca 12 mm long. Scattered throughout by streams and near bodies of water. 3-12. Native of Europe.

7. **Avena** L. Oats

1a. Teeth of lemmas tipped with two bristle-like setae ca 4 mm long — 1. **A. barbata**
1b. Teeth of lemmas acute, lacking setae
  2a. Lemmas densely bearded at the base; spikelets usually 3-flowered — 2. **A. fatua**
  2b. Lemmas glabrous; spikelets usually 2-flowered — 3. **A. sativa**

1. ***A. barbata** Brot. Slender Oat. Annual, awn stout, geniculate, twisted; pedicels capillary, curving; usually 2-flowered. Frequent throughout the mountains in a variety of habitats, especially along roadsides and in grassland. 2-4. Native of the Mediterranean region.

2. ***A. fatua** L. Wild Oat. Annual; awn stout, geniculate, twisted below; pedicels stiff. With No. 1, but more common. 2-7. Native of western Eurasia and North Africa.

3. ***A. sativa** L. Common Oat. Annual; awn often absent, straight (rarely geniuclate) if present. Casual escape from cultivation, about fields; Point Dume. Widely cultivated but not known as a wild plant.

8. **Bothriochloa** Kuntze

1. **B. barbinoides** (Lag.) Herter. var. **barbinoides**. [**Andropogon barbinoides** Lag.]. Cane Bluestem. Perennial, 6-13 dm tall; panicles silvery, tufted. Uncommon, in sandy soil along coast, from Sepulveda Canyon to Point Mugu. 2-5.

9. **Briza** L. Quakinggrass

1. ***B. minor** L. Annual, 1-5 dm tall; pannicle erect; spikelets pendent. Rare; reported from Camarillo and Tapia Park. Native of Europe. 5-7.

10. **Bromus** L.

1a. Spikelets strongly flattened; lemmas compressed and keeled
  2a. Lemmas awnless or with an awn to 2 mm long
    3a. Lemmas 12-16 mm long, usually with 13 nerves; blades broad, yellowish-green — 11. **B. wildenovii**
    3b. Lemmas 10-12 mm long, with 9-11 nerves; blades narrow, bluish-green — 10. **B. unioloides**
  2b. Lemmas with a prominent awn at least 5 mm long
    4a. Strictly annual; spikelets with not more than 7 florets; upper glume 1-3 (-4) mm shorter than lowest lemma — 1. **B. arizonicus**
    4b. Usually perennial; spikelets with up to 9 florets; upper glume 4-8 mm shorter than lowest lemma — 2. **B. carinatus**
1b. Spikelets not strongly flattened; lemmas not compressed and keeled
  5a. Plants perennial, the spikelets drooping — 6. **B. pseudolaevipes**
  5b. Plants annual
    6a. Lemmas broad, rounded apically, the teeth at apex ca 0.5 mm long — 4. **B. hordaceus**
    6b. Lemmas narrow, acuminate, the teeth 2-5 mm long
      7a. Awn geniculate, twisted at base — 9. **B. trinii**
      7b. Awn straight

8a. Panicle dense, erect; pedicels straight
9a. Culms pilose with short spreading hairs near the top; panicle dense; teeth of lemmas 3-5 mm long — 7. **B. rubens**
9b. Culms usually glabrous or scabrous near the top; panicle rather loose; teeth of lemmas 2-3 mm long — 5. **B. madritensis**
8b. Panicle open, the branches spreading or drooping; pedicels often flexuous
10a. Spikelets 2.5-3.5 cm long, including the awns; awns 10-18 mm long — 8. **B. tectorum**
10b. Spikelets 7-9 cm long, including the awns; awns 3.5-6 cm long — 3. **B. diandrus**

1. **B. arizonicus** (Shear.) Stebbins. Annual, 1-3 m tall; panicle rather strict. Occasional in coastal sage scrub and weedy ground; coast west of Point Dume, Sepulveda Canyon, West Los Angeles. 3-4.

2. **B. carinatus** H. & A. Perennial, similar to **B. arizonicus**; panicle often more lax. Fairly common below 2000 ft in coastal sage scrub, chaparral, and southern oak woodland; throughout. 3-5.

3. ***B. diandrus** Roth. [**B. rigidus** of Calif. floras]. Ripgut Grass. Rather coarse annual to 8 dm tall. Common throughout in grassland and along roadsides in a variety of plant associations, but in chaparral only where disturbed. 3-5. Native of the Mediterranean region.

4. ***B. hordaceus** L. subsp. **hordaceus.** [**B. mollis** L.] Soft Brome or Soft Chess. Strict annual with fairly dense panicle; spikelets narrowly ovate; lemmas usually soft-pubescent. Common throughout, below 2000 ft in coastal sage scrub and southern oak woodland and on the borders of chaparral. 3-5. Native of Europe and western Asia.

5. ***B. madritensis** L. Similar to **B. rubens**, but culms glabrous. Widely scattered, mostly in southern oak woodland below 2000 ft from Sepulveda Canyon westward. 4-5. Native of the Mediterranean region.

6. **B. pseudolaevipes** Wagnon. Clumped perennial with pubescent blades 3-9 mm wide. Scattered throughout on protected slopes in southern oak woodland away from the coast. 4-6.

7. ***B. rubens** L. Foxtail Chess. Erect annual 0.5-4 dm tall; spikelets ca 2.5 cm long, including the awns; pedicels often very short. Common throughout in coastal sage scrub, southern oak woodland, and disturbed chaparral. 3-5. Native of the Mediterranean region.

8. ***B. tectorum** L. Downy Brome or Cheat Grass. Erect annual 2-6 dm tall; panicle more or less open. Sporadic in southern oak woodland and weedy places; drainage of Malibu Creek, vicinity of Santa Monica. 4-6. Native of the Mediterranean region.

9. **B. trinii** Desv. Erect annual 2-7.5 dm tall; sheaths pilose; spikelets 1.7-2.5 cm long, including the weak awns. Los Alisos Canyon. 5-6.

10. ***B. uniloides** H.B.K. [**B. haenkeanus** Calif. refs.]. Rescue Grass. Course perennial or biennial to 1 m tall; panicle loose. Occasional weed in waste ground and about plantings at lower elevations throughout. 3-8. Native of temperate South America.

11. ***B. wildenovii** Kunth. [**B. catharticus** Vahl.]. Rescue Grass. Doubtfully distinct from **B. uniloides**. Weed in waste ground, Santa Monica. 4-6. Widely cultivated. Native of northeastern South America.

11. **Chloris** Swartz

1. ***C. gayana** Kunth. Rhodes Grass. Plants perennial, producing long stolons; culms 1-1.5 m tall; spikes 5-10 cm long; awns 1-5 mm long. Locally established waste ground; Santa Monica, West Los Angeles. 5-9. Native of Africa.

12. **Cortaderia** Stapf. Pampasgrass

1. ***C. atacamensis** (Phil.) Pilger. [**Gynerium atacamensis** Phil., **C. selloana** of Calif. auth.]. Large perennial, 2-6 m tall, with culms in dense clumps; leaves densely clustered at base of tall, floriferous shoots. Naturalized around seepage areas. Native of Chile. 8-9.

13. **Crypsis** Ait.

1. ***C. niliacea** Fig. & De Not. [**C. schoenoides** (L.) Lam., **Heleochloa schoenoides** (L.) Host.]. Densely matted, prostrate annual; sheaths bearded at summit; upper part of inflorescence barely visible about sheath. Moist strand of drying pond, Lake Eleanor. 9-10. Native of the eastern Mediterranean region.

14. **Cynodon** Rich.

1. ***C. dactylon** (L.) Pers. Bermuda Grass. Creeping, wiry perennial with flowering culms 1-4 dm tall; spikelets 2 mm long. Common below 2000 ft throughout; mostly in disturbed areas. 4-10. Widespread in the warm regions of both hemispheres.

15. **Dactylis** L.

1. ***D. glomerata** L. Orchardgrass. Coarse glaucous perennial, to 1.5 m tall; lemmas pointed, 5-6 mm long, unawned. Rare in moist weedy places and about lawns; scattered throughout. 5-7. Native of temperate Eurasia and North Africa.

16. **Digitaria** Heist. Crabgrass

1a. Sheaths usually pilose; upper (inner) glume up to half the length of the spikelet 1. **D. ciliaris**
1b. Sheaths usually glabrous; upper (inner) glume about equal to spikelet 2. **D. ischaemum**

1. ***D. ciliaris** (Retz) Koel. [**D. adcendens** (H.B.K.) Henr.]. Annual, to 1.5 m tall. Occasional at lower elevations throughout, usually in disturbed soil. 6-10. Native of the Mediterranean region; widely introduced elsewhere.

2. ***D. ischaemum** (Schreb.) Schreb. ex Muhl. Annual to perennial, culms decumbent, up to 4 dm long. About lawns and in waste ground in the eastern half of the mountains; rare elsewhere. 9-11. Native of warm-temperate Eurasia.

17. **Distichlis** Raf.

1. **D. spicata** (L.) Greene subsp. **spicata**. Salt Grass. Prostrate perennial; culms to 4 dm tall; panicle 1-6 cm long. Common in and about salt marshes and other saline habitats along the entire coast; rare and local about wet places inland. 3-10.

18. **Echinochloa** Beauv.

1a. Awns lacking; branching simple, the primary branches not overlapping or only overlapping for a short distance, ca 1 (-2) cm long 2. **E. crusgalli**
1b. Awns longer than the spikelets, usually present on at least some of the spikelets; branching usually compound, the primary branches overlapping, more than 2 cm long 1. **E. colona**

1. ***E. colona** (L.) Link. Annual 2-4 cm tall; panicle relatively lax, 0.5-1.5 dm long. Infrequent but sometimes locally common in waste places or about planted areas; Westwood; Woodland Hills. 7-11. Native of the Old World tropics.

2. ***E. crus-galli** (L.) Beauv. Barnyard Grass. Coarse, nearly succulent annual to 1 m tall; panicle dense, 1-3 dm long. Occasional in moist places as along creeks at lower elevations throughout. 7-10. Widespread in warm temperate and tropical regions.

19. **Ehrharta** Thunb.

1. ***E. erecta** Lam. Bright green perennial with flat blades 4-9 mm wide; spikelets 3-3.5 mm long, with two large sterile lemmas below the fertile lemma. Abundantly naturalized in more or less shaded areas. 1-12. Native of South Africa.

20. **Elymus** L. Ryegrass

1a. Rachis continuous, disarticulating only tardily, and that rarely; glumes not greatly elongate
2a. Lemmas awnless or the awn not exceeding half the length of the lemma; spikelets 6-40 at a node; plants over 1.5 m tall
3a. Spikelets 6-40 at a node — 1. **E. condensatus**
3b. Spikelets mostly 1 at a node — 4. **E. triticoides**
2b. Lemmas with a distinct awn 1-2 times the length of the lemma; spikelets 2-3 at most nodes; plants not more than 1.2 m tall — 2. **E. glaucus**
1b. Rachis disarticulating into joints at maturity; glumes setaceous and greatly elongate — 3. **E. multisetus**

1. **E. condensatus** Presl. Giant Ryegrass. Coarse, clumped perennial, 1.5-3.5 m tall; spike dense, 1.5-5 dm long; spikelets 10-15 mm long. Very common throughout the mountains from the upper ocean beach to coastal sage scrub, chaparral, and southern oak woodland. 5-8.

2. **E. glaucus** Buckl. Tufted perennial 6-12 dm tall; spikes dense but more slender than No. 1. 5-20 cm long; spikelet 10-12 mm long. Frequent; shaded places in coastal sage scrub, chaparral, and southern oak woodland throughout. 4-6.

3. **E. multisetus** (J. G. Sm.) Davy. [**Sitanion multisetus** J. G. Sm., **S. jubatum** J. G. Sm]. Squirreltail. Tufted perennial, 2-6 dm tall; spikes dense, thick; glumes with awns 3-8 cm long. Rare; upper drainage of Malibu Creek, in southern oak woodland. 5-6.

4. **E. triticoides** Bud. Rhizomatous perennial, creeping; 6-12 dm tall; spike 10-20 cm long; spikelets 12-20 mm long; Tapia Park.

21. **Eragrostis** Beauv.

1a. Plants creeping, rooting at the nodes, matted — 3. **E. hypnoides**
1b. Plants not rooting at the nodes, more or less erect
2a. Plants with yellowish glands present about margins of leaves, on midribs of lemmas, and on panicle branches — 2. **E. cilianensis**
2b. Plants lacking glands
3a. Main branches of panicle with spikelets borne nearly to base; spikelets borne nearly to base; spikelets ca 1.5 mm wide; lemmas ca 2 mm long — 1. **E. barrelieri**
3b. Main branches of panicle without spikelets near base; spikelets ca 1 mm wide; lemmas 1.3-1.7 mm long — 4. **E. orcuttiana**

1. ***E. barrelieri** Daveau. Annual, 2-5 dm tall. Weed along borders of field near Point Mugu. 6-10. Native of Mediterranean region.

2. ***E. cilianensis** (All.) E. Mosher. [**E. megastachya** (Koel.) Link.]. Stinkgrass. Annual, 2-5 dm tall; spikelets 2.5-3 mm wide; lemmas ca 2.5 mm long. Weed about plantings, Westwood. 7-8. Native of warmer regions of Old World.

3. **E. hypnoides** (L.) B.S.P. Teal Lovegrass. Creeping annual, rooting at nodes. Locally common on strand of Lake Eleanor, with **Crypsis schoenoides.** 9-10.

4. **E. orcuttiana** Vasey. Annual, 6-10 dm tall. Occasional throughout near field or in weedy places at lower elevations; sometimes around lakes. 5-10.

22. **Festuca** L. Fescue

1a. Lemmas awned, minutely 2-toothed at apex — 3. **F. elmeri**
1b. Lemmas awnless or very short-awned, not toothed at apex
2a. Panicle 1-2 dm long; lemmas 5-7 mm long — 2. **F. pratensis**
2b. Panicle 1.5-3.5 dm long; lemmas 7-10 mm long — 1. **F. arundinacea**

1. ***F. arundinacea** Schreb. Large, rather coarse, tufted perennial, to 1.2 m tall. Weedy places and disturbed soil near Santa Monica and along Mulholland Drive; Malibu Lagoon. Native of temperate Eurasia.

2. **F. elmeri** Scribn. & Merr. var. **conferta** (Hack.) Hitchc. Clumping perennial, 5-12 dm tall. Southern oak woodland, Piuma Road east of Rambla Pacifica, 1400 ft. Not otherwise known south of San Luis Obispo County. 5.

3. ***F. pratensis** Huds. [**F. elatior** L.]. Meadow Fescue. Perennial, spreading by creeping rhizomes; culms 5-12 dm tall. Occasional in and near lawns in the vicinity of Santa Monica and West Los Angeles. 5-7. Native of Europe.

23. **Gastridium** Beauv.

1. ***G. ventricosum** (Gouan.) Schinz & Thell. Nit Grass. Slender annual 1-3 dm tall; panicle dense, shining; glumes 4-5 mm long, unequal, tapering to a long point; lemma pubescent, plump, ca 1 mm long. Rare on brushy slopes at the northwestern edge of the mountains. 4-6. Native of western Europe and the Mediterranean region.

24. **Hordeum** L. Barley

- 1a. Plants perennial, growing in small tufts in moist places — 1. **H. californicum**
- 1b. Plants annual
  - 2a. Glumes of central spikelet and inner ones of lateral spikelets conspicuously long-ciliate — 4. **H. murinum**
  - 2b. Glumes not ciliate
    - 3a. Awn usually 8-15 cm long; all three spikelets at node fertile; rachis not disarticulating — 5. **H. vulgare**
    - 3b. Awn 0.8-1.5 cm long; lateral spikelets sterile; rachis disarticulating at maturity
      - 4a. Inner glumes of lateral spikelets dilated, 0.6-1.8 mm wide — 3. H. **intercedens**
      - 4b. Inner glumes of lateral spikelets not dilated, bristle-like — 2. H. **geniculatum**

1. **H. californicum** Covas & Stebbins. Tufted perennial to 0.6 m tall; leaves pubescent; glumes not ciliate; awn 7-15 mm long. Clumps along stream in southern oak woodland near Lake Sherwood; Trancas Canyon. 5-6.

2. ***H. geniculatum** Allioni. [**H. hystrix** Roth.]. Tufted annual to 4 dm tall; auricles absent; joint at top of lateral spikelets obvious, the glumes inserted at the same level. Dry clayey field in open southern oak woodland west of Cornell Corners. 4-5. Native of Europe and the Mediterranean region.

3. **H. intercedens** Nevski. [**H. pusillum** Nutt.]. Little Barley. Slender annual to 3.5 dm tall; auricles absent; joint at top of pedicels of lateral spikelets obscure, the glumes inserted at different levels. Along rill in dry adobe soil, northeast slopes of Conejo Mountain. 4-5.

4. ***H. murinum** L. [**H. glaucum** Steud., **H. stebbinsii** Covas]. Hare or Foxtail Barley. Erect annual 1-5 dm tall. Widespread in a variety of habitats, often where disturbed, below 2000 ft. 3-7. Native of the Mediterranean region. Two subspecies occur in our area. Plants with anthers 0.2-0.5 mm long, entire or slightly lobed at base, included at anthesis; prolongation of rachilla or lateral spikelets 1-2.2 mm long are subsp. **glaucum** (Steudel) Tzvelev. Plants with anthers 0.8-1.5 mm long, with strongly bilobed base, exerted at anthesis; prolongation of rachilla of lateral spikelets 2.8-3.7 mm long are subsp. **leporinum** (Link) Arcangeli. The latter subsp. is perhaps not as common and in moister habitats.

5. ***H. vulgare** L. Common Barley. Stout erect annual to 1.2 m tall; prominent clawed auricles present at junction of blade and sheath. Throughout the mountains in small clumps along road, but scarcely established. 4-7. Cultivated widely, the place of origin unknown.

25. **Koeleria** Pers.

1. **K. pyramidata** (Lam.) Reauv. [**K. gracilis** Pers., **K. macranthera** (Ledeb.) Soreng., **K. cristata** of most authors]. Junegrass. Tufted perennial with leaves usually not half as long as the culms; spikelets ca 5 mm long. Occasional in southern oak woodland, northern slope of the western half of the mountains. 4-6.

26. **Lamarckia** Moench.

1. ***L. aurea** Moench. Goldentop. Annual with soft blades 3-7 mm wide; pedicels with a tuft of long white hairs at the base; fertile spikelet about 2 mm long; sterile spikelets 6-8 mm long. Occasional in coastal sage scrub or chaparral throughout. 3-5. Native of the Mediterranean region.

27. **Leptochloa** Beauv.

1a. Lemmas distinctly awned 1. **L. fascicularis**
1b. Lemmas awnless, sometimes mucronate 2. **L. uninervia**

1. **L. fascicularis** (Lam.) A. Gray. [**Diplachne fascicularis** (Lam.) Beauv.]. Annual, 3-10 dm tall. Occasional in moist places near the coast; Point Mugu to Venice, Westwood. 6-10.

2. **L. uninervia** (Presl.) Hitchc. & Chase. [**Diplachne uninervia** (Presl.) Parodi]. Mexican Sprangletop. Annual; culms coarse, succulent, 5-10 dm tall. Scattered; dry sandy soil of creek bottoms; Calleguas Creek, Malibu Lake. 6-10.

28. **Lolium** L. Ryegrass

1a. Glumes shorter than spikelet 1. L. perenne
1b. Glumes nearly equal to the spikelet in length 2. **L. temulentum**

1. ***L. perenne** L. var. **perenne**. Perennial Ryegrass. Blades of leaves rolled or folded at midrib when young. Two doubtfully distinct subspecies have been recognized on the basis of whether the lemma is awned or not, an apparently artificially separation in this species. Annuals with lemmas awnless have been treated as subsp. **multiflorum** (Lam.) Husnot, and biennials or short lived perennials with lemmas awned have been treated as subsp. **perenne**. Both subspecies occur in waste places, mostly near gardens and lawns; widespread but scattered. Grown as a lawn grass. 4-10. Native of temperate Eurasia and North Africa.

2. ***L. temulentum** L. Darnel. Rigid annual; lemmas becoming thick and hard, the awn stiff, rough, up to 2 cm long. Rare along roadsides; Malibu Creek drainage, Los Alisos Canyon, head of Franklin Canyon. 4-5. Native of the Mediterranean region.

29. **Melica** L.

1. **M. imperfecta** Trin. Erect, somewhat tufted perennial, 3-11 dm tall; spikelets 4-7 mm long. Abundant throughout in coastal sage scrub, chaparral, southern oak woodland, and on burns, often on shallow soil. One of our most common grasses. 3-5.

30. **Monanthochloe** Engelm.

1. **M. littoralis** Engelm. Perennial; culms tufted, forming mats; blades falcate. Coastal salt marsh; Point Mugu. 3-4.

31. **Muhlenbergia** Schreb.

1a. Delicate annual with open panicle and capillary awns 1-1.5 cm long 1. **M. microsperma**
1b. Stout clumped perennial with dense spicate panicle, lacking awns 2. **M. rigens**

1. **M. microsperma** (DC.) Kunth. Littleseed Muhly. Usually purplish annual; lemmas ca 3 mm long. Scattered throughout on dry slopes in shallow soil, mostly under chaparral, below 2000 ft. 2-5.

2. **M. rigens** (Benth.) Hitchc. Deergrass. Perennial, to 1.5 m tall; leaves involute. Rare and local in open ground, often under oaks; central and western portions of the mountains below 2000 ft. 5-9.

32. **Oryzopsis** Michx. Ricegrass

1. ***O. miliacea** (L.) Benth. & Hook. ex Aschers. & Schweinf. Smilo Grass. Coarse perennnial with flat blades 5-10 mm wide; panicle 15-30 cm long, diffuse; lemmas ca 2 mm long. Fairly common in

weedy ground along roadsides and becoming established along streams, below 2000 ft, throughout. 6-10. Native of Mediterranean region.

33. **Panicum** L. Panic Grass

1a. Panicle erect; spikelets not more than 4 mm long 1. **P. capillare**
1b. Panicle drooping; spikelets 4.5-5 mm long 2. **P. miliaceum**

1. **P. capillare** L. var. **occidentale** Rydb. Erect annual, 2-8 dm tall; sheaths hispid; leaves 5-15 mm wide; spikelets 2.5-4 mm long. Occasional weed; Malibu Creek, Triunfo Canyon. 7-9.

2. ***P. miliaceum** L. Broom-Corn Millet. Stout annual 0.1-1m tall; sheaths long-villous; leaves 7-25 mm wide; spikelets 4.5-5 mm long. Occasionally established as a waif from cultivation about Santa Monica and West Los Angeles. 6-7. Native of the warm parts of the Old World.

34. **Parapholis** C. E. Hubb.

1. ***P. incurva** (L.) C. E. Hubb. [**Pholiurus incurvus** (L.) Schinz]. Sickle Grass. Tufted annual with curved spikes; spikelets 4-6 mm long. Borders of lagoon in coastal salt marsh, Point Mugu. 5-6. Native of western Europe and the Mediterranean region.

35. **Paspalum** L.

1a. Racemes paniculate, not clustered at the apex of the culm; plants growing in clumps 1. **P. dilatatum**
1b. Racemes paired (rarely 3) at the summit of the culm; plants with extensively creeping stolons 2. **P. paspalodes**

1. ***P. dilatatum** Poir. Dallis Grass. Stout, clumped perennial, 0.5-1.5 m tall. Occasional about lawns and in weedy ground in eastern end of the mountains; infrequent elsewhere. 6-11. Native of South America from Brazil to Argentina.

2. **P. paspalodes** (Michx.) Scribn. [**P. distichum** Auth. not L.]. Knotgrass. Perennial; culms to 6 dm tall. Creeping and rooting at the nodes and locally abundant in wet places; often mosty vegetative; Los Angeles River; Lake Sherwood; Malibu Lake. 6-10.

36. **Pennisetum** Rich.

1a. Culms creeping extensively; spikelets hidden by upper sheaths, only the stigmas visible 1. **P. clandestinum**
1b. Culms tufted, not creeping; spikelets in an exserted purplish panicle 2. **P. setaceum**

1. ***P. clandestinum** Hochst. ex Chiov. Kikuyu Grass. Low growing perennial. Aggressively spreading, from lawns to become well established; common in eastern end of mountains, rare westward from Sepulveda Canyon and Santa Monica; vicinity of Saddle Peak. 7-10. Native of Africa.

2. ***P. setaceum** (Forsk.) Chiov. Fountain Grass. Perennial, 0.5-1.3 m tall, erect; leaves 2-3 mm wide, slender. Commonly planted and occasionally locally established eastward from Sepulveda Canyon and Santa Monica; vicinity of Saddle Peak. 7-10. Native of Africa.

37. **Phalaris** L. Canary Grass

1a. Plants perennial, clumped with rhizomes 1. **P. aquatica**
1b. Plants annual
  2a. Spikelets in groups of 7, 1 fertile surrounded by 6 sterile, the group falling entire in groups 4. **P. paradoxa**
  2b. Spikelets all alike, not falling entire in groups
    3a. Spikelets with two short sterile lemmas over 2 mm long inside the glumes below the fertile lemma; glumes 7-8 mm long; fertile lemma 5-6 mm long 2. **P. canariensis**
    3b. Spikelets with a single sterile lemma ca 1 mm long; glumes 4-6 mm long; fertile lemma ca 3 mm long 3. **P. minor**

1. ***P. aquatica** L. [**P. tuberosa** L. var. **stenoptera** (Hack.) Hitchc.]. Harding Grass. Stout, clumping perennial, to 1.5 m tall. Planted for forage and becoming established, especially under oaks at western end of the range and scattered localities throughout. 5-8. Native origin unknown.

2. ***P. canariensis** L. Erect annual, 3-6 dm tall. Infrequent waif in disturbed soil in the vicinity of West Los Angeles and Santa Monica. 4-7. Native of the western Mediterranean region.

3. ***P. minor** Retz. Erect annual, 3-9 dm tall. Disturbed soil and waste places; Santa Monica, Conejo Grade. Native to Mediterranean region.

4. ***P. paradoxa** L. Tufted annual, 3-6 dm tall; panicle dense, 2-6 cm long, oblong. Rare weed from grassy areas in Malibu Creek State Park. Introduced from Mediterranean Region. 5.

38. **Phragmites** Trin.

1. **P. australis** (Cav.) Trin. ex Steudel. [**P. communis** Trin. var. **berlandieri** (Fourn.) Fourn.]. Common Reed. Perennial; culms stout, 2-4 m tall; spikelets 10-16 mm long. Moist places, Point Dume. 7-11.

39. **Poa** L. Bluegrass

1a. Plants annual — 1. **P. annua**
1b. Plants perennial
  2a. Lemmas with a conspicuous cottony web of hairs at base; panicle more or less diffuse — 2. **P. palustris**
  2b. Lemmas lacking cottony web, more or less strigose; panicle relatively congested — 3. **P. scabrella**

1. ***P. annua** L. Annual Bluegrass. Culms to 0.3 m tall; spikelets 3-6 mm long; lemmas lacking web at base. Occasional throughout in more or less disturbed areas or weedy situations, especially where relatively moist. 1-12. Native of temperate Eurasia.

2. **P. palustris** L. Fowl Bluegrass. Rather slender perennial; spikelets 3-4.5 mm long; lemmas 2.5-3 mm long, strigose on keel and marginal nerves. Rare in more or less shaded seasonally wet places; Sandstone Peak, 2200 ft; Seminole Hot Springs.

3. **P. scabrella** (Thurb.) Benth. ex Vasey. Malpais Bluegrass. Perennial; culms 0.4-1 m tall; spikelets 6-10 mm long; lemmas 3-5 mm long, glabrous or puberulent. Fairly common throughout in shallow soil of more or less exposed situations. 3-5.

40. **Polypogon** Desf. Beard Grass

1a. Plants perennial; awn of glumes 3-5 mm long — 1. **P. interruptus**
1b. Plants annual, but often rank; awn of glumes 6-8 mm long — 2. **P. monspeliensis**

1. **P. interruptus** H.B.K. Perennial; lemmas with an awn ca 2 mm long. In moist places, uncommon; near Point Dume; Los Alisos Canyon; near Conejo Grade. 4-8.

2. ***P. monspeliensis** (L.) Desf. Erect annual, to 1 m tall; lemmas with an awn ca 2 mm long. Common in moist places throughout, below 2000 ft. 4-10. Native of Eurasia and portions of Africa.

41. **Schismus** Beauv.

1. ***S. barbatus** (L.) Thell. Slender annual to 3 dm tall with filiform leaves. Rare weed along roadsides and about plantings; Piuma Road, Griffith Park. 2-3. Native of the Mediterranean region.

42. **Setaria** Beauv.

1a. Plants tufted, perennial; spikelets ca 2 mm long — 1. **S. geniculata**
1b. Plants annual; spikelets 3 mm long — 2. **S. lutescens**

1. ***S. geniculata** (Lam.) Beauv. Knotroot Bristlegrass. Perennial, ± caespitose, 3-10 dm tall. Common in and about waste ground throughout the eastern half of the mountains. 5-10. Native of

warmer regions of North and South America.

2. ***S. lutescens*** (Werg.) F. T. Hubb. [**S. glauca** auct. non (L.) Beauv.]. Annual, 3-6 dm tall. Rare weed along streets, Westwood. 6. Native of the colder parts of Old World.

43. **Sorghum** Moench.

1. ***S. halepense*** (L.) Pers. Johnson Grass. Stout perennial, to 1.5 m tall, with coarse leaves up to 2 cm wide; awn ca 1 cm long, deciduous. Frequent and persistent weed of fertile soil thoughout. 3-10. Warmer parts of world.

44. **Sporobolus** R. Br.

1. ***S. indicus*** (L.) R. Br. Tufted perennial 0.3-1 m tall; panicle more or less spicate, contracted; awns absent. Rare lawn weed, Westwood. 9-10. Native of tropical Asia.

45. **Stenotapharum** Trin.

1. ***S. secundatum*** (Walt.) Kuntze. St. Augustine Grass. Coarse stoloniferous perennial with flattened culms; flowering stems to 3 dm tall; spikelets sunken in pits on the rachis. Cultivated as a lawn grass and locally established; Westwood, Santa Monica. 7-9. Native of the American tropics.

46. **Stipa** L. Needlegrass

1a. Lemmas densely appressed-villous with hairs ca 3 mm long — 2. **S. coronata**
1b. Lemmas strigose, the hairs about 0.5 mm long
  2a. Lemmas ca 6 mm long; awn 2.5-4 cm long — 3. **S. lepida**
  2b. Lemmas 5-13 mm long; awn 6-11 cm long
    3a. Lemmas slender, cylindric; middle culm leaves 1.2-2.4 mm wide; awn mostly 9-12 times as long as lemma — 1. **S. cernua**
    3b. Lemmas fusiform, obviously thicker at the middle; middle culm leaves 2.4-6 mm wide; awn mostly 7-9 times as long as lemma — 4. **S. pulchra**

1. **S. cernua** Stebbins & Love. [**S. pulchra** var. **cernua** Benth. & Tofsrud.]. Clumped perennial, to 1 m tall; foliage mostly glaucous. Scattered in coastal sage scrub and chaparral, western half of the mountains below 2000 ft. 3-6.

2. **S. coronata** Thurb. Coarse clumped perennial to 2 m tall; blades flat, 5-10 mm wide; lemma ca 9 mm long; awn 3.5-5 mm long. Occasional, coastal sage scrub, chaparral; throughout, except for the western end of the mountains. 4-6.

3. **S. lepida** Hitchc. Slender tufted perennial, to 1 m tall; blades flat, 2-4 mm wide. Common throughout in coastal sage scrub; southern oak woodland and about the borders of chaparral. 3-5.

4. **S. pulchra** Hitchc. Clumped perennial, to 1 m tall; foliage mostly green. Occasional in open grassland, coastal sage scrub, southern oak woodland; nearly throughout; not known from easternmost end of the range. 3-6.

47. **Triticum** L.

1. ***T. aestivum*** L. Wheat. Annual, 6-10 dm tall. Scarcely established, but scattered plants not infrequent along roadsides and about fields. 4-5. Originated in cultivation in Eurasia.

48. **Vulpia**

1a. Inflorescence strict, its branches ascending, subappressed
  2a. Spikelets usually with more than 5 florets, dense; lower glume ca 3 mm long, more than half as long as upper glume — 4. **V. octoflora**
  2b. Spikelets usually with fewer than 5 florets, relatively loose; lower glume to 2 mm long, less than half as long as upper glume
    3a. Lemmas conspicuously long-ciliate near apex — 1. **V. megalura**
    3b. Lemmas not long-ciliate — 3. **V. myuros**

1b. Inflorescence less dense, its branches and sometimes individual spikelets spreading and at maturity reflexed
  4a. Lemmas and glumes pubescent — 2. **V. microstachys**
  4b. Lemmas and glumes glabrous
    5a. Pedicels of mature spikelets appressed to the rachis — 5. **V. pacifica**
    5b. Pedicels of mature spikelets reflexed — 6. **V. reflexa**

1. **V. megalura** (Nutt.) Rydb. [**Festuca megalura** Nutt.]. Foxtail Fescue. Simple or tufted annual, 2-6 dm tall. Rather frequent throughout in coastal sage scrub and open southern oak woodland or disturbed chaparral; often in weedy areas. 3-5.

2. **V. microstachys** (Nutt.) Benth. var. **ciliata** (Beal) Lonard & Gould. [**F. microstachys** Nutt., **Festuca eastwoodae** Piper]. Similar to **V. reflexa**. Shallow soil on grassy slopes, rare; upper drainage of Malibu Creek, Triunfo Pass. 4-5.

3. ***V. myuros** (L.) Rydb. [**Festuca myuros** L.]. Rat-tail Fescue. Annual 2-6 dm tall. Weedy ground or about plantings, infrequent; vicinity of Santa Monica and West Los Angeles, Griffith Park. 3-4. Native of Europe and the Mediterranean region.

4. **V. octoflora** (Walt.) Rydb. [**Festuca octoflora** Walt.]. Sixweeks Fescue. Tufted annual, often less than 10 cm tall. Rare, in open soil in chaparral above Temescal Canyon and probably elsewhere; established locally on burns. 4.

5. **V. pacifica** Rydb. [**Festuca pacifica** Piper]. Annual, 2-5 dm tall. Shallow soil and on burns; Arroyo Sequit and perhaps elsewhere. 4-5.

6. **V. reflexa** (Buckl.) Rydb. [**Festuca reflexa** Buckl.]. Annual, 2-4 dm tall. Shallow soil in grassy openings; scattered localities in central and western half of the mountains. A specimen from Triunfo Pass is intermediate between this and the preceding species. 4-5.

POTAMOGETONACEAE

1. **Potamogeton** L. Pondweed

1a. Leaves broad, margins serrulate and crisped — 1. **P. crispus**
1b. Leaves linear — 2. **P. pectinatus**

1. ***P. crispus** L. Leaves submerged, 2-6 cm long, 5-12 mm wide, obtuse, crisped, serrulate; inflorescence a cylindric spike, 1-1.8 cm long; fruit ovoid, 3-keeled, ca 3 mm long, with a beak ca 2 mm long. Rare; Malibu Creek State Park, **Grayum & Koutnik 844** (SFV, DAV). Native of Europe.

2. **P. pectinatus** L. Sego Pondweed. Submerged, rhizomatous herb; stems slender; leaves filiform, alternate; flowers sessile in short, compact spikes with pedicels not elongating; fruit thus sessile; peduncle and axis of inflorescence elongating in fruit; fruiting inflorescence thus an open spike; fruits obliquiely ovoid with length about equalling the width, beak very short. Shallow water in lakes in the western portion of the range. 9-10.

RUPPIACEAE

1. **Ruppia** L. Ditch-Grass

1. **R. maritima** L. Submerged herb; stems slender; leaves filiform alternate; flowers short pedicellate in a terminal cluster on a long peduncle, both pedicels and peduncles elongating in fruit, pedicels becoming 1-3 cm long, peduncles much longer and often spiraled; fruits ovoid, pointed. Brackish water of coastal lagoons. 6-10.

TYPHACEAE Cat-Tail Family

1. **Typha** L. Cat-Tail

1a. Male and female portions of spikes separated, at least 1 cm apart; pollen shed singly	1. **T. domingensis**
1b. Male and female portions of spikes contiguous; pollen shed in tetrads	2. **T. latifolia**

1. **T. domingensis** Pers. Perennial, 2-3 m tall; leaves 6-9; female spike brown to tan, 1.5-2.2 cm thick. Occasional, marshy areas along streams and lakes; Malibu Creek drainage, eastward along the coast to Santa Inez Lake, usually growing with **T. latifolia.** 8-10.

2. **T. latifolia** L. Soft-flag. Perennial, 1-2.5 m tall; leaves 12-16; female spike brown to dark brown, mostly 2-2.5 cm thick, darker and thicker than in **T. domingensis.** Marshy areas along streams and lakes throughout. 8-10.

ZANNICHELLIACEAE

1. **Zannichellia** L. Grass-Wrack

1. **Z. palustrus** L. Submerged, rhizomatous herb; stems slender; leaves filiform, opposite; fruits sessile, clustered at the nodes, obliquely oblong, about twice as long as broad, with a distinct, slender beak. Shallow water at the margins of lakes and sloughs in the western portion of the range. 9-10.

ZOSTERACEAE Eelgrass Family

1a. Plants dioecious; fruit cordate at base; leaves 1.5-4 mm wide	1. **Phyllospadix**
1b. Plants monoecious; fruit ovoid; leaves mostly 6-12 mm wide	2. **Zostera**

1. **Phyllospadix** Hook. Surf-Grass

1a. Spadix usually 1, on flowering stems 1-2 dm long	1. **P. scouleri**
1b. Spadices 2-6, on flowering stems 3-10 dm long	2. **P. torreyi**

1. **P. scouleri** Hook. Very similar to No. 2. Occuring on the most exposed, surfbeaten rocky shores; surfweed community. Reported as along the coast near Santa Monica. 5-7.

2. **P. torreyi** S. Wats. Submerged perennial with filiform leaves ca 1.5 mm wide and often 1-2 m long; inflorescence endlosed by a spathe with membranous edges; flowers borne in two rows on the side of a flattened spadix. On rocks in areas of heavy surf and also in tide pools, exposed during the lower tides; surfweed community. 5-11.

2. **Zostera** L. Eel-Grass

1. **Z. marina** L. Submerged perennial; stems branched, 1-3 m long; leaves 3-15 dm long. Reported Mugu Lagoon; marine meadow.

GLOSSARY

The following glossary is primarily a partial listing of the glossary by Keck in Munz (1974); reproduced with permission.

Acaulescent. Stemless or essentially so.

Accrescent. Increasing in size with age, as often with the calyx.

Actinomorphic. Exhibiting radial symmetry, as a regular flower.

Acumen. A tapering point.

Acuminate. Gradually tapering to a short point.

Acute. Sharp-pointed, but less tapering than acuminate

Adnate. Unlike parts grown together.

Achene. A small, dry, hard, indehiscent, 1-seeded fruit.

Alternate. Any arrangement of parts along the axis other than opposite or whorled; situated regularly between other organs, as stamens alternate with petals.

Annual. Of one year's or season's duration from seed to maturity and death.

Anther. The pollen-bearing part of the stamen.

Anthesis. Strictly, the time of expansion of the flower, but also used for the period during which the flower is open and functional.

Apical. Situated at the tip.

Appressed. Pressed flat against another organ.

Arachnoid. Cobwebby; of soft and slender entangled hairs.

Articulate. Jointed; having a place for a natural separation with clean-cut scar.

Attenuate. Slenderly tapering or prolonged; more gradual than acuminate.

Auricle. An ear-shaped appendage.

Auriculate. Bearing auricles.

Awn. A terminal slender bristle on an organ.

Axil. Upper angle formed by a leaf or branch with the stem.

Axillary. In an axil.

Banner. Upper petal of a papilionaceous flower.

Barbellate. With short, usually stiff hairs.

Barbellulate. The diminutive of barbellate.

Basal. Relating to, or situated at, the base.

Beak. A prolonged firm tip, as of a seed or fruit.

Berry. A pulpy indehiscent with no true stone, as a tomato.

Biennial. Of two years' duration from seed to maturity and death.

Bilabiate. Two-lipped, as to calyx or corolla.

Bilocular. Two-celled, as to ovary.

Blade. The expanded part of a leaf or petal.

Bract. A reduced leaf subtending a flower.

Bracteate. With bracts.

Bractlet. A secondary bract borne on a pedicel instead of on the peduncle; sepaloid organ subtending the sepals.

Bracteolate. With bractlets.

Bulb. An underground leaf-bud with thickened scales or coats like an onion.

Caespitose. In tufts or dense clumps.

Callosity. A hardened thickening.

Callus. A callosity; the thickened extension at the base of the lemma in some grasses; the thickened area on the bracts of **Rumex**.

Calyx. The outer, usually green, whorl of the perianth, composed of separate or united sepals.

Campanulate. Bell-shaped.

Canescent. Covered with grayish-white fine hairs.

Capillary. Hairlike.

Capitate. Head-shaped; aggregated into very dense clusters or heads.

Capsule. A dry dehiscent fruit composed of more than one carpel.

Carinate. Keeled; with a sharp longitudinal ridge.

Carpel. A simple pistil, or one of the modified leaves forming a compound pistil.

Caryopsis. A grain or fruit of grasses. Dry, hard, indehiscent, one-seeded fruit.

Catkin. A scaly deciduous spike.

Caudex. The woody base of an otherwise herbaceous perennial.

Caulescent. With an obvious leafy stem; plants with radical leaves and flowers on a scape are called acaulescent.

Chaff. Thin dry scales.

Ciliate. Fringed with hairs on the margin.

Circumscissile. Dehiscing by a transverse line around the fruit or anther, the top falling off as a lid. Abscission of the calyx by a transverse line such that all the calyx lobes come off as a unit.

Clasping. Leaf partly or wholly surrounding the stem; amplexicaul.

Clavate. Club-shaped; gradually thickened toward the apex from a slender base.

Claw. The narrow petiol-like base of some petals and sepals.

Cleft. Divided to about the middle.

Cleistogamous. Small flowers self-fertilizing without opening.

Compound. Having two or more similar parts in one organ. Compound leaf: one with two or more separate leaflets.

Compressed. Flattened laterally.

Conic. Cone-shaped, with the point of attachment at the broad base.

Connate. United similar parts.

Connective. Portion of the filament connecting the two cells of an anther.

Connivent. Converging or coming together, but not organically united.

Contorted. Twisted, bent, or distorted.

Cordate. Heart-shaped with the notch at the base.

Coriaceous. Leathery in texture; tough.

Corm. A short, bulblike, underground stem, as the "bulb" of gladiolus.

Corolla. The inner whorl or whorls of the perianth, composed of colored separate or united petals.

Corymb. A flat-topped or convex racemose inflorescence, the lower or outer pedicels longer than upper or inner ones.

Corymbose. In corymbs.

Cotyledon. The primary leaf or leaves of the embryo. Seed-leaves.

Crenate. Having the margin cut with rounded teeth; scalloped.

Crenulate. Minutely crenate.

Crown. The persistent base of an herbaceous perennial; the top of a tree.

Cuneate. Wedge-shaped; triangular with the narrow part at the point of attachment.

Cuspidate. Tipped with a cusp, or sharp, short, rigid point.

Cyathium. The inflorescence of **Euphorbia** and **Chamaesyce**; composed of unisexual flowers borne on the inside of funnelform receptacle, bearing glands and often with petaloid appendages; resembling an individual flower.

Cyme. A flat topped or convex paniculate inflorescence, with the central flowers opening first.

Deciduous. Falling off.

Decompound. More than once divided or compounded.

Decumbent. Lying down, but with the tip ascending.

Decurrent. Extending down the stem below the insertion point.

Deflexed. Turned abruptly downward.

Dehiscent. Opening spontaneously when ripe to discharge the contents, as an anther or ovary.

Dendritic. Treelike.

Dentate. Having the margins cut with sharp teeth directed outward not forward.

Digitate. Fingered; shaped as an open hand.

Dilated. Flattened and expanded.

Dioecious. Having staminate and pistillate flowers on differnt plants.

Discoid. Disklike. In the Asteraceae, a head without ray-florets.

Disk. A fleshy development of the receptacle about the base of the ovary. In Asteraceae, the tubular flowers (disk-florets) of the head.

Dissected. Deeply divided into numerous fine segments.

Distal. Opposite the point of attachment; apical; away from the axis.

Divaricate. Widely divergent.

Drupe. A fleshy, one-seeded, indehiscent fruit containing a stone, like a peach.

Emarginate. With a small notch at the apex.

Endocarp. The inner layer of the pericarp.

Entire. Undivided.

Erose. Irregularly toothed as if gnawed.

Exfoliate. To peel off in thin layers or plates.

Exserted. Protruding.

Fascicle. A close cluster or bundle of flowers, leaves, stems, or roots.

Fasciculate. In a fascicle.

Fastigiate. Clustered, parallel, erect branches.

Fetid. Disagreeably odorous.

Filament. A thread; the stalk of an anther.

Filiform. Threadlike.

Fistular. Hollow throughout, as an onion leaf.

Fistulous. Fistular.

Flexuous. Zigzag.

Floccose. With tufts of soft woolly hair.

Floret. The individual flower of the Asteraceae or Poaceae. A small flower of a dense cluster.

Foliolate. Having leaflets.

Follicle. A dry, monocarpellate fruit, opening only on the ventral suture.

Frond. Leaf of a fern.

Fugacious. Perishing very early.

Funnelform. Gradually widening upwards, like a funnel.

Galea. The helmetlike upper lip in certain bilabiate corollas.

Galeate. Having a galea.

Geniculate. Bent abruptly.

Gibbous. Swollen on one side.

Glabrate. Almost glabrous.

Glabrous. Without hairs.

Glaucous. Covered or whitened with a bloom or wax.

Glomerule. A compact capitate cyme.

Glumes. The pair of bracts at the base of a grass spikelet.

Granular. Covered with very small grains or granules; minutely mealy.

Granulose. Granular.

Gynophore. The prolonged stipe of a pistil.

Hastate. Of the shape of an arrowhead but with the basal lobes turned outward.

Head. A dense globular cluster of sessile or subsessile flowers arising from the same point on the peduncle; capitulum.

Herb. A plant without a persistent woody stem.

Herbaceous. Pertaining to an herb.

Herbage. Collectively, the green parts of a plant.

Hermaphroditic. Bisexual. Of flowers with both stamens and pistil.

Heteromorphic. Of more than one king of form.

Hilum. The scar at the point of attachment of an ovule or seed.

Hirsute. Rough with coarse or shaggy hairs.

Hirsutulous. Diminutive of hirsute.

Hispid. Rough with stiff or bristly hairs.

Hispidulous. Diminutive of hispid.

Homomorphic. Of only one kind of form.

Hyaline. Colorless or translucent, transparent.

Hybrid. A cross between two species.

Hypanthium. A cup-shaped enlargement of the receptacle on which the calyx, corolla, and often the stamens or inserted; in perigyny "calyx-tube".

Imbricate. Overlapping as shingles on a roof.

Indusium. In ferns, the epidermal outgrowth that covers or invests the sorus.

Inferior ovary. An ovary that is adnate to the hypanthium and situated below the calyx-lobes.

Inflorescene. The flower-cluster of a plant.

Internode. The portion of stem between two nodes.

Involucel. A secondary involucre, as the bracts subtending the secondary umbels in the Apiaceae.

Involucre. A whorl of bracts (phyllaries) subtending a flower cluster.

Joint. The node of a grass culm; an articulation.

Keel. A prominent dorsal ridge, analogous to the keel of a boat; the two lower and united petals of a papilionaceous corolla.

Laciniate. Cut into narrow lobes or segments.

Lanate. Woolly; densely invested with long entangled hairs.

Lanose. Lanate.

Lanceolate. Lance-shaped; much longer than broad, tapering from below the middle to the apex and (more abruptly) to the base.

Leaflet. A segment of a compound leaf.

Lemma. In grasses, the lower of the two bracts enclosing the floret.

Ligneous. Woody.

Ligule. The strap-shaped part of a ray corolla in the Asteraceae; the thin collar-like appendage on the inside of the blade at the junction with the sheath in grasses.

Ligulate. With a ligule.

Linear. Resembling a line; long and narrow, of uniform width.

Locule. A chamber of an ovary, anther or fruit.

Locular. Having a locule.

-merous. Greek suffix, having parts, as pentamerous or 5-merous flower = having 5 sepals, 5 petals, 5 anthers, 5 carpels.

Midrib. The central rib or vascular bundle of a leaf or other organ.

Monoecious. Having staminate and pistillate flowers on the same plant but not perfect flowers.

Mucro. A small and short abrupt tip of an organ.

Mucronate. With a mucro.

Mucronulate. Minutely mucronate.

Muricate. Rough with short and firm sharp excrescences.

Muriculate. Diminutive of muricate.

Nerve. A simple vein or vascular bundle of a leaf or other organ.

Node. The joint of a stem; the point of insertion of a leaf or leaves.

Nut. A hard-shelled and one-seeded indehiscent fruit.

Nutlet. Diminutive of nut.

Ob-. Latin prefix signifying the reverse or contrariwise.

Oblanceolate. Inversely lanceolate.

Oblong. Much longer than broad with nearly parallel side.

Obovate. Inversely ovate.

Obtuse. Blunt or rounded at the end.

Opposite. Set against, as leaves when two at a node.

Orbicular. Approximately circular.

Ovary. The part of the pistil that contains the ovule.

Ovate. A plane with an outline of an egg.

Ovoid. A solid with an ovate outline.

Ovule. The body within the ovary that becomes the seed.

Palea. One of the chafflike sclaes on the receptacle of many Asteraceae; the inner bract of a grass floret, often partly invested by the lemma.

Palmate. Hand-shaped with the fingers spread.

Panicle. A compound racemose inflorescence.

Papillate. Bearing minute conical processes or papillae.

Papillose. Papillate.

Pappus. The modified calyx-limb in Asteraceae, consisting of a crown of bristles or scales on the summit of the achene.

Pedicel. The stalk of a single flower.

Pedunculate. The general term for the stalk of a flower or an inflorescence.

Peltate. Shield-shaped; a flat body having the stalk attached to the lower surface instead of at the base or margin.

Pendent. Suspended or hanging.

Pendulous. Pendent.

Perennial. Lasting from year to year.

Perianth. The floral envelopes collectively; calyx + corolla.

Pericarp. The ripened walls of the ovary.

Petal. One of the leaves of a corolla, usually colored.

Petaloid. like a petal.

Petiole. A leaf-stalk.

Petiolate. Having a petiole.

Phyllary. An bract of the involucre of the Asteraceae.

Pilose. Bearing soft and straight spreading hairs.

Pinnate. A compound leaf, having the leaflets arranged on each side of a common petiole or rachis.

Pinnatisect. Pinnately divided to the midrib.

Pistil. The ovule-bearing organ of a flower, consisting of stigma, style, and ovary.

Pistillate. Unisexual flowers with only pistils.

Placenta. The ovule-bearing surface of an ovary.

Plumose. Feathery.

Pollen. The male spores produced in an anther.

Pome. An applelike fruit.

Prickle. Sharp outgrowth of the bark or epidermis.

Procumbent. Trailing on the ground but not rooting.

Puberulent. Minutely pubescent.

Pubescent. Covered with short soft hairs.

Punctate. Dotted with puncture or with translucent pitted glands or with colored dots.

Pustulate. Bearing irregular blisterlike swellings or pustules, mostly at the base of hairs.

Pyriform. Pear-shaped.

Raceme. A simple, elongate, indeterminate inflorescence with each flower subequally pedicelled.

Racemose. Of the nature of a raceme or in racemes.

Rachilla. A small rachis, specifically the axis of a grass spikelet.

Rachis. The axis of a spike of a raceme, or of a compound leaf.

Ray. A primary branch of an umbel; the ligule of a ray-floret.

Receptacle. That protion of the floral axis upon which the flower parts are borne, or, in Asteraceae, that which bears the florets in the head.

Recurved. Bent backwards.

Reflexed. Abruptly bent downward.

Regular. Of flowers having radial symmetry, with parts in each series alike.

Reniform. Kidney-shaped.

Retrorse. Bent backward or downward.

Revolute. Rolled backwards or with margins rolled under.

Rhizome. An underground stem.

Rhizomatous. Having a rhizome.

Rhombic. Somewhat diamond-shaped.

Rib. The primary vein, vascular bundle, of a leaf.

Rosette. A crowded cluster of radiating leaves appearing to rise from the ground.

Rosulate. In the form of a rosette.

Rotate. Wheel-shaped.

Rudimentary. Imperfectly developed.

Rugose. Wrinkled.

Runcinate. Sharply pinnatifid or incised, the lobes pointing downward.

Saccate. With a sac or pouch.

Sagittate. Shaped as an arrowhead, with basal lobes turned downward.

Samara. An indehiscent winged fruit.

Scaberulous. Minutely roughened.

Scabrid. Somewhat rough.

Scabrous. Rough to the touch, due to short stiff hairs.

Scape. A leafless peduncle rising from the ground in acaulescent plants.

Scapose. Resembling or bearing a scape.

Scarious. Thin, dry, and membranaceous, not green.

Seed. The ripened ovule.

Sepal. A leaflike member or segment of the calyx.

Serrate. Saw-toothed, the sharp teeth pointing forward.

Serrulate. Finely serrate.

Sessile. Attached directly by the base; not stalked, as a leaf without a petiole.

Seta. A bristle, or a rigid, sharp-pointed bristlike organ.

Setaceous. Bristly or bristlelike.

Setose. Clothed with bristles.

Sheath. The tubular basal part of the leaf that encloses the stem, as in grasses and sedges.

Shrub. A woody plant of smaller proportions than a tree, which usually produces several branches from the base.

Silicle. A short silique, not much longer than wide.

Silique. A narrow many-seeded capsule of the Brassicaceae, with 2 valves splitting from the bottom and leaving the placentae with a false partition between them.

Simple. Unbranched, as a stem or hair; a leaf that is not compound.

Sinuate. With a strongly wavy margin.

Sinus. The cleft or recess between two lobes.

Solitary. Borne singly.

Sordid. Of a dull or dirty hue.

Sorus. A fruit-dot, or -cluster on the back of the fronds of ferns.

Spadix. A spike on a succulent axis enveloped in a spathe.

Spathe. A broad sheathing bract enclosing a spadix.

Spatulate. Like a spatula.

Spine. A sharp-pointed, stiff, woody body, arising from below the epidermis.

Spore. The reproductive body of pteridophytes and lower plants.

Spur. A slender, saclike, nectariferous process from a petal or sepal.

Stamen. The male organ of the flower, which bears the pollen.

Staminate. Unisexual flowers with only stamens.

Stellate. Star-shaped.

Stigma. The receptive part of the pistil on which pollen germinates.

Stipe. The leaf-stalk of a fern; the stalk beneath an ovary.

Stipule. One of the pair of usually foliaceous appendages found at the base of the petiole in many plants.

Stolon. A modified stem bending over and rooting at the tip; or creeping and rooting at the nodes; or a horizontal stem that gives rise to a new plant at its tip.

Stoloniferous. Having stolons.

Stria. Narrow groove or channel.

Striate. Marked with fine longitudinal lines or furrows.

Strict. Very straight and upright.

Strigose. Clothed with sharp and stiff-appressed straight hairs.

Strigulose. Minutely strigose.

Strobilus. Conelike aggregation of sporophylls.

Style. The contracted portion of the pistil between the ovary and the stigma.

Sub-. Latin prefix meaning somewhat, almost, of inferior rank, beneath.

Subulate. Awl-shaped.

Succulent. Juicy; fleshy and soft.

Suffrutescent. Obscurely shrubby; very little woody tissue.

Superior. Growing above, as an ovary that is free from the other floral organs.

Symmetrical. Of a flower having the same number of parts in each whorl.

Taproot. A primary stout vertical root giving off small lateral roots but not dividing.

Tendril. A slender, coiling or twining organ which supports a climbing plant.

Terete. Cylindrical; round in cross-section.

Tetrad. A group of 4, as 4 pollen grains adhering together.

Thallus. A flat leaflike organ.

Thorn. A sharp pointed stiff woody body derived from a modified branch.

Throat. The orifice of a connate corolla; the expanded portion above the tube.

Thyrse. A compact, ovate panicle; strictly, with the main axis indeterminate, but with the other axes cymose.

Thyrsoid. Like a thyrse.

Tomentose. Covered with a rather short, densely matted, soft white wool.

Tomentum. A covering of densely matted, soft white wool.

Transverse. Perpendicularly across the longitudinal axis.

Trichome. A hair or bristle.

Truncate. As if cut off squarely at the end.

Tubercle. A small tuberlike prominence, warty excrescence or nodule.

Tuberculate. Beset with tubercles.

Tubular. Shaped like a hollow cylinder.

Turbinate. Top-shaped; inversely conical.

Umbel. A flat or convex inflorescence in which the pedicels arise from a common point, like rays of an umbrella.

Umbilicus. A navel; the hilum of a seed.

Uncinate. Hooked at the tip.

Utricle. A small, bladdery one-seed fruit.

Valve. One of the segments into which a dehiscent capsule or legume separates.

Vein. A vascular bundle of a leaf or other flat organ.

Verticel. A whorl, or circular arrangement of similar parts about the same node on an axis.

Verticellate. Whorled.

Villous. Bearing long and soft and not matted hairs; shaggy.

Virgate. Wand-shaped; slender, straight and erect.

Viscid. Sticky.

Whorl. A ring of similar organs radiating from a node; verticil

Zygomorphic. Bilaterally symmetrical; that which can be besected by only one plane into similar halves.

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Because the flora is alphabetical the taxa are only indexed to the generic level except for synonyms and common names, which are indexed to the specific level. Common names that consist of more than word or are hyphenated are to be found under the last word except for a few Spanish names, e.g. Bull Thistle is listed under Thistle; Sunflower Family, under Family; Surf-Grass, under Grass; and Yerba Mansa, under Yerba. Many common names of certain groups are inconsistently treated as one word (e.g. Quakinggrass, Woodfern) while others are treated as two words (e.g. Panic Grass, Brack Fern). In such groups one may have to look in two places for the common names. Synonyms are enclosed in parentheses.

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